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THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

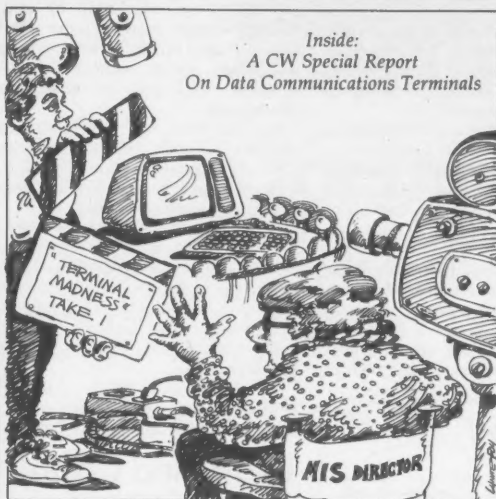
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NEWSPAPER



DPMA Takes Stand Against Cobol Draft

By Rita Shoor

CW Staff

CHICAGO — The Data Processing Management Association is going on record as being "strongly opposed" to the American National Standards Institute's proposed Cobol standard.

The strongly debated standard was recently made available for public review and comment after a 32-11 vote in its favor by members of Ansi's X3 Committee for Information Systems [CW, Oct. 12]. The DPMA opposed the public review because the standards document "isn't in a final enough form," according to Art Dubnow, principal DPMA representative on X3.

The vote to open the Cobol document to public appraisal did not alter Dubnow's position. "We are now opposed to it becoming a standard," maintained Dubnow, who chairs the DPMA Standards Committee.

The DPMA has two primary objections to the document in its current form, he explained. First, the proposed standard is not upwardly compatible with Cobol 74. The millions of Cobol source code lines already written in earlier versions of the language would make the cost of conversion prohibitive for many organizations, Dubnow said.

The other objection stems from the fact that the language enhancements con-

tained in the proposed standard would be, in effect, "forced on the user. There are many good enhancements [in the document]... and some we don't like. But, in any case, those enhancements should be optional," Dubnow said.

"If the enhancements are mandatory, then they must be upwardly compatible," he continued. As it stands right now, "you get all of the enhancements or none of them."

Copies of the proposal, for (Continued on Page 2)

Awacs Not Exactly State-of-the-Art: Experts

By Bruce Hoard

CW Staff

Much of the "sensitive technology" in the controversial Airborne Warning and Controls Systems jets the Reagan administration wants to sell to Saudi Arabia is 1960s vintage, and the rest may be too complex for any potential enemy to understand, experts have told *Computerworld*.

Beyond that, the USSR may have an equivalent of the U.S. Awacs by the time the Saudis would take control of theirs in 1985.

The primary electronic elements of the proposed Saudi Awacs include a CPU, radar, communications equipment and software to manage the system.

If the deal goes through,

the Saudis will get a break on the CPU. Instead of receiving the CCI model installed on the first Awacs, they are to receive the more sophisticated CC2. What is the commercial equivalent of a CCI?

"The architecture of the machine is the same as that used in the IBM 360 series," said U.S. Air Force Col. Henry B. Fisher, deputy program director for Awacs. "If you look at it from a throughput point of view, it's roughly the equivalent of the 360/70."

The 360/70 was first commercially available in 1964. According to IBM, only one 360 system, a Model 360/50, was ever sold to the USSR or in Eastern Europe. That machine was sold to the USSR Ministry of Chemistry "some

time ago," according to an IBM spokeswoman.

What About CC2?

What about the CC2? "It's roughly the same thing as an IBM 370/168," Fisher added. The 370/168 was first introduced commercially in 1972 and no 370 series computers have ever been sold to Eastern Europe or to the USSR, IBM said.

The Awacs radar system slated for delivery on the Saudi planes was developed by the Westinghouse Corp. Aerospace and Electronics Systems Division in Baltimore. Referred to as "E3A," it is not exactly state-of-the-art, according to U.S. Department of Defense (DOD) spokesman Lt. Col. Mark Foutch.

Asked if E3A was '60s technology, he replied, "Right. When it comes time to go into production on a defense article, you pretty well have to freeze the basic technology, and the decision to make Awacs was made in the early '70s."

Foutch also downplayed the likelihood that the Soviets — should they ever obtain an Awacs plane in toto — would bother to try to reverse engineer the radar. Such a feat would be difficult to accomplish because the manufacturing techniques and equipment are more sensitive than the actual end product, he pointed out.

More importantly, however, the DOD spokesman added, "By the time the Saudis (Continued on Page 10)

IBM Flexes Muscles, Adds Bigger 3081, More 3033s

By Tim Scannell

CW Staff

WHITE PLAINS, N.Y. — IBM last week flexed its muscles with the introduction of a high-end 3081 said to be up to 40% more powerful than the original model.

IBM also unveiled:

- Two additional versions of its 3033 Model Group S processor, both with performance improvements of about 10%.
- Two cache-based storage subsystems that reportedly offer users of its 3350 and 3380 storage devices more consistent terminal response time, fast data retrieval and transfer and more effective use of disk capacity.
- Two bidirectional desktop printers that can operate at burst speeds up to 450 char./sec.

Finally, IBM announced purchase price reductions of approximately 10% on most models of its 3033 processor and cuts of up to 15% on the contract maintenance prices for its 3031, 3032 and 3033 processors.

The 3081 Model Group K, which replaces the original Model Group D (now known as Model Group J) as IBM's top-of-the-line system, incorporates the same dual-processor configuration as the earlier 3081, which made its debut nearly a year ago. However, on the latest model, IBM has doubled the buffer storage normally assigned to each of the 3081's central processors to 64,000 char.

In addition, the firm has modified the 3081's instruction processing organization so that the latest machine reportedly executes instructions more efficiently.

The doubled buffer storage and improved instruction processing organization on the Group K processor give the system 1.4 times the internal performance of the 3081 Model Group D, according to an IBM spokesman. They also push the system's processing power, rated in millions of instructions per sec-

ond (Mips), above that of Amdahl Corp.'s 580-5660 computer and to about the same level as National Advanced Systems' AS/9000 DPC processor, according to *Computerworld* estimates.

Current users of the Group D can field upgrade to the more powerful Group K, the spokesman noted.

Purchase price of an IBM 3081 Model Group (Continued on Page 4)

Software Introductions Accompany Hardware

By Lois Paul

CW Staff

WHITE PLAINS, N.Y. — Along with its announcement last week of the 3081 Model K processor, IBM unveiled System/370 Extended Architecture (XA) which, it claimed, complements the internal speed of very large processors.

Also included in the software announce-

This week's In Depth, 'IBM's System Software Strategy for the '80s,' follows Page 48.

ments were new facilities designed to enable operators at a host processor to control IBM 4300 processors in remote locations as well as new releases of IBM's MVS and VM control programming system products.

The System/370 XA is comprised of MVS/System Product (MVS/SP) Version 2 and associated data management facilities that are known collectively as MVS/XA.

These reportedly provide control programming support for the new System/370 XA (Continued on Page 6)



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MCI No. 9 to File for DTS License

By Phil Hirsch

CW Washington Bureau
 WASHINGTON, D.C. — MCI Telecommunications Corp. last week became the ninth applicant for a license to offer wideband, all-digital communications services in major cities throughout the nation.

In the wake of applications from such companies as Satellite Business Systems, GTE Telenet Communications Corp. and Graphic Scanning Corp. [CW, Oct. 19], MCI requested authority to build digital termination systems (DTS) in 30 cities.

In an interview with *Computerworld*, Brian Thompson, MCI's vice-president of corporate development, said the company plans to put digital termination systems networks in 40 to 45 cities. The first half-dozen of these should be installed by mid-1983, added Jerry Wilkins, a member of Thompson's staff.

Like all of the other applicants, MCI plans to begin its digital termination systems network in the largest cities

of the country; and like all but one of the others, MCI will utilize a microwave-based digital termination system developed by Local Digital Distribution Co. in Rockville, Md.

Essentially it consists of a central transceiver that communicates with the user through a pair of 5 MHz microwave channels capable of transmitting 1.5M bit/sec in each direction. Time division techniques share the capacity on each channel among multiple users who can be up to about six miles away.

At the user's site is a 2-ft diameter send/receive antenna, linked by cable to the management information systems (MIS) terminal interface.

Thompson emphasized that MCI's decision to offer digital termination services does not mean the company now intends to shift to data from voice, its bread-and-butter business.

"We believe that replacing our analog switching equipment with digital switches, and then adding digital transmission facilities, will reduce

the costs of our present voice service," he explained. "Digital termination systems networks will be installed concurrently with those facilities to increase our traffic."

How fast MCI installs additional digital termination systems networks, beyond the first half dozen scheduled for completion by mid-'83, will depend mainly on the speed at which MCI builds, leases and buys additional digital switching/transmission facilities, according to Thompson.

The pace of digital conversion will depend, in turn, on how rapidly costs are reduced by the technology and on customer demand for integrated voice/data services.

Although some digital termination systems applicants have said they could have service up and operating before the end of next year, the MCI official indicated this will be impossible. Reason: The microwave equipment will not be delivered until the following year.

Shoor Named Managing Editor

FRAMINGHAM, Mass. — Rita Shoor has been named managing editor of *Computerworld*.

As managing editor, Shoor will direct the daily operations of the CW editorial department, coordinating the news-gathering staff here and in three domestic bureaus.

Shoor, formerly CW's senior editor/software, joined the paper in April 1980. She was responsible

for the weekly coverage of the Software and Services section and for reporting general news.

Before coming to CW, she was a principal of Shoor and Associates, a Chicago-based DP consulting firm. She has worked in various DP capacities — from programmer to project manager — at several major companies in Illinois. Shoor holds a B.A. degree from DePaul University.

DPMA Opposes Proposed Cobol

(Continued from Page 1)

mally designated dpANS X3.23-198X, are available for \$25 from the X3 Secretariat, Computer and Business Equipment Manufacturers Association (Cbema), Suite 1200, 1828 L St. N.W., Washington, D.C. 20036. Comments should be sent to both Cbema and to the Ansi Board of Standards Review, 1430 Broadway, New York, N.Y. 10018.

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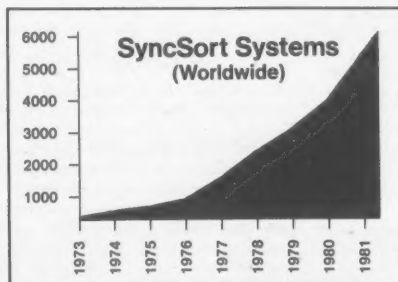
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The September 1, 1971 issue of **COMPUTERWORLD** carried a page-one story about a series of sorting benchmarks conducted at a New York bank. The article reported that a new "Synchronized Sort" had used dramatically fewer computer resources than the IBM sort programs against which it had been tested.

A couple of other quotes from the article are worth noting. One was that the new sort was "unbeatable by other commercially available sorts on a one-for-one comparison." The other was that "a patent is being sought to cover the new concepts" of the sort.

That "Synchronized Sort" soon became known by a shorter, punchier name—SyncSort. And a lot of things have happened to it and to sorting during what might be called the "SyncSort Decade." Here are a few of them...

- **The Patent**—We not only applied for it, we got it. U.S. Patent 4,210,961 recognizes a long list of "sorting innovations" we pioneered throughout the decade.
- **Growth**—The number of SyncSorts installed rose from zero to over 6,000. We are now the sorting choice of more than 70% of the nation's major data processors, including 46 of the top 50 companies on the Fortune 500 list.
- **Equality**—We brought high-performance sorting to DOS and CMS—by incorporating our OS breakthroughs into new SyncSorts for those systems.
- **Performance**—It got better and better as new releases of SyncSort appeared. We are still unbeatable by any other sort. SyncSort simply uses significantly less CPU Time and EXCPs to do the sorting job. That became apparent again when we tested IBM's latest OS release—5740-SM1, Release 5. It was another example of "too little, too late."
- **Productivity**—SyncSort has reinforced its reputation as the "programmer's best sorting friend." As the programmer shortage has tightened and human costs have gone up, we've constantly added new features to make simple applications that use the sort faster and easier. Things like INCLUDE/OMIT, INREC/OUTREC, SUM, and new Record Formatters.
- **Service**—We were the first sort vendor to offer centralized Technical Service. And as the decade has gone on, that service has gotten better and better. Today, about 85% of all requests for service are resolved within 24 hours.

So if you're a user, thanks for making this the best birthday SyncSort ever had. And if you're not a user, well, come on over and join the party.

Industry Analysts Say

IBM Announcements Hold No Big Surprises

By Tom Henkel

CW Staff

Industry analysts said IBM's flurry of hardware and software announcements last week did not offer any big surprises, but they did shed some light on IBM's intended direction in large systems processing.

Jack Hart, an analyst with International Data Corp., and Gerard Hallaren, an analyst with The Yankee Group, agreed the announcement virtually eliminates IBM's 30 series as a viable contender in the firm's product lineup.

Of the 30 series processors, only the 3033S (a processor IBM just announced with increased memory and performance features) remains viable, Hart said. But, he added, a possible high-end addition to IBM's 4300 line could eliminate that processor some time in the future.

Consistent with other announcements affecting the 30 series, maintenance and price cuts across most of the line indicate IBM's efforts to sell off as many leased 30 series processors as possible before those processors become a drag on the market.

Hart said the Oct. 21 cuts mark the third time IBM has lowered prices on the 30 series line. Prices were cut in late 1979 when the 3033N was announced and cut again when the first 3081 processor and the 3033S were announced last November.

Calling the 3033U processor some-

thing of a miracle, Hallaren said that while that processor's days are numbered, it can remain viable for up to nine more months. Other members of the 30 series — such as the 3033A and 3033M processors — were virtually eliminated as contenders when the 3081 was announced last year. Earlier 30 series processors, the 3031 and 3032, were eliminated by announcements of the 3033N and 3033S respectively, Hallaren said.

Destined to Fail

Gartner Group analyst Dave Stein said IBM's pricing strategy on the 30 series will not work. He contended the industry is aware there are more 3081 processors to be announced and most users will hold off purchasing a 3033 in lieu of a smaller 3081. Such a processor may be announced in the first quarter of 1982, according to Stein.

"It won't work and they haven't the courage to admit it," Stein said. He added that the 3033 pricing strategy is part of a traditional IBM year-end budgeting problem called "the silly season" — where money is running out for projects and marketing departments are scrambling to dredge up additional revenue. This year, with profits down, Stein said, the silly season is even sillier and the 3033 pricing scheme is evidence that IBM is trying to milk the last few dollars out of the 3033 line.

IBM also took steps to clear up a long-standing mystery about why the 3880 communications processors were originally designed.

The 3880s were announced with a massive surplus of microcode that had analysts guessing the 3880 would eventually be built into a back-end processor. With the latest two models, the analysts agreed the enhancements are a step in that direction.

Hallaren said Storage Technology Corp. forced IBM's hand on the 3880 question several months ago when it announced a back-end storage system called the VSS. In response to that announcement, IBM came up with the 3880 Models 11 and 13, which IBM has not stated have back-end processing capabilities.

The new 3880 models may slow users' growing demand for disk drives by offering a more efficient means of mass storage, Hallaren said. While IBM certainly makes money in the disk market, analysts said there is a growing dissatisfaction among users on the quantity of drives necessary to cope with voluminous IBM operating systems and utilities.

Eased Deliveries

Stein said the announcement will make both 3350 and 3380 disk drives operate faster in 3081 environments and will at least ease current delivery problems with the 3350s and the

somewhat troubled 3380 drives.

Local control of remote 4300 processors is a key feature in IBM's distributed processing strategy. Users have long complained that both the 4331 and 4341 processors need too highly skilled operators to be effective in distributed environments. The alternative has been IBM's 8100 line, which communicates with 370-era processors only through emulation.

While some analysts said the 8100 is IBM's key to overcoming the problems of migrating its users out of 370-era software in a painless way, users have complained 8100 processors are not equipped with enough main memory to be effective in stand-alone or distributed sites. Also, since the 8100 forces users into buying comparatively new hardware and software, the units have not sold well according to IBM standards, analysts said.

Fate of 8100

By allowing VM-based 4300 processors to operate in both VM and MVS environments, IBM raises a question on the fate of the 8100 line. Recent enhancements to the 8100 indicate IBM still has plans for the processors, but analysts report there have been bitter internal battles within IBM over whether the 4300 or 8100 would be IBM's starcase DDP nodes. Analysts said the remote support feature clouds the issue.

Stein contends IBM will not have a problem selling both the 8100 and 4300 in distributed environments because they are aimed at different customers. The 8100 is aimed at mini-computer users desiring large IBM host compatibility and the 4300 is for software-compatible distributed environments.

Hallaren contended that all the pieces of what has been called the Hydra project within IBM — namely local support of remote 4300s — are now in place. All that remains are some significant utility programs to connect all the pieces together.

Since the 3081 was announced last year, analysts have been predicting IBM would announce a native operating mode for the system. Last week, IBM announced 31-bit addressing on MVS, which means IBM plans to take advantage of at least seven of the eight bits unused by the 24-bit 370-era software. Hallaren said the 31-bit announcement is an indication IBM plans to stick with MVS as its big system operating system.

Both analysts and users have made note that IBM's large systems were designed for 32-bit addressing and the software only used a 32-bit address space for some time. Some IBM user groups have also been pushing IBM to support a full 32-bit addressing.

IBM's seemingly ambitious delivery schedule on the 3081 Model Group K indicates there are only minor changes to the 3081 processor to achieve the added 40% throughput. IBM has announced a field upgrade package for the Model Group K, which indicates all that is necessary to make the change is a series of circuit board swaps, the analysts said.

IBM Adds High-End 3081, More 3033s

(Continued from Page 1)

K with 16 channels and 16M char. of main storage is \$4,320,000. The processor can be leased for \$124,000/mo under terms of a four-year agreement or rented for \$155,000/mo. First customer shipments are scheduled for the second quarter of 1982.

The new 3033 Model Group S processors offer 12M- and 16M char. of main storage, respectively — twice the previous maximum. IBM has also doubled the buffer storage on each of the computers' processors to 1,000 char. and has announced that it will double the buffer storage on all of the Group S processors — including those already installed — free of charge.

The doubled buffer storage, which essentially reduces the time it takes for the processor to access data, can reportedly improve internal performance by as much as 10%.

The 3033 Model Group S with 16M char. of main storage costs \$1,443,000. It can be leased for \$93,160/mo under a four-year agreement or rented on a monthly basis for \$102,475.

The 3880 Models 11 and 13 storage subsystems — which are enhanced versions of the 3880 storage control unit and are developed by IBM's General Systems Division — feature an internal cache storage device and microprocessor-based dynamic data management that allow the unit to locate and transfer data to a host processor at speeds approaching 3M char./sec, the spokesman said.

Like previously announced 3380 storage control units, the subsystems

contain two microprocessor storage directors that provide separate data paths to the host processor.

In the Model 11, one of the storage directors is geared to handle paging functions and dynamically manages up to four 3350 direct-access storage devices. The system has an 8M-char. cache memory to retain and transfer active pages and automatically remove pages from storage when they become less active.

The Model 11 can reportedly transfer a page of information — consisting of about 4K char. — over a 3M char./sec channel in less than 3 msec. It can be attached to IBM's 370/158 and 370/168, 4341, 30 series and 3081 channels — which range in speed from 1.5M- to 3M char./sec — and is supported by MVS/SP Version 1 Release 3.1 and VM/SP high-performance option Release 3 programming.

Model 13

The Model 13 contains two enhanced storage directors, either 4M- or 8M char. of cache storage, and supports up to eight IBM 3380 storage devices. This subsystem is basically designed to transfer active application and system data from electronic storage to host processors via the 3M char./sec data streaming channels. The Model 13 is compatible with IBM's 4341, 30 series and 3081 processors and is supported by MVS/SP Version 1 Release 3.1 system control programming, the spokesman pointed out.

The purchase price for IBM's Model 11 storage system is \$251,520. The

lease price, under a two-year agreement, is \$6,080/mo while the monthly rental cost is \$7,145.

The Model 13 storage unit with 8M char. of cache storage sells for \$260,880, leases for \$6,305 and rents for \$7,410.

The Models 11 and 13 storage systems are scheduled to begin shipment in the second and third quarters of 1982, respectively, the spokesman said.

The 3230 receive-only and 3232 keyboard send-receive (KSR) desktop printers, also introduced last week, use an electromatrix printing process to produce high-speed printing and high-resolution characters. In the electromatrix process, characters are formed by electronic impulse. As the units' print heads are passed over the surface of aluminum-coated roll paper, they remove dots from the aluminum coating, exposing character images from a contrasting dark underlayer.

The printers operate at burst speeds of 450 char./sec., the spokesman claimed.

The 3230 printer can provide printouts of CRT display screens on operator command and is available in two versions: the Model 1, which is compatible with IBM's 8100 information system; and the Model 2, which attaches to the firm's 3270 information display system.

The IBM 3232 KSR printer Models 1 and 2 can be used with a variety of the firm's processors including the 8100, 4300 and larger machines.

Both models of the 3230 and 3232 printers can be purchased for \$4,150.

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IBM Also Announces Variety of Software

(Continued from Page 1)

and expand addressing capabilities. Virtual and real storage of up to 2G bytes can be accessed using 31-bit addressing, the vendor said.

Extended Architecture also is said to provide "bimodal" operation, which enables users to write new programs using extended addressing and permits the concurrent execution of 24-bit and 31-bit programs.

Extended Architecture is said to more than double the number of devices that can be attached to the 3081, and to improve channel and processor efficiency and utilization.

A dynamic channel subsystem supported by MVS/XA reportedly permits either of the 3081's two CPUs to use any or all of the processor's channels and to transfer data to and from peripheral devices more efficiently.

IBM also announced the VM/XA Migration Aid, with which it said users can install MVS/XA while running the current MVS/SP Version 1

in a single 3081 processor.

MVS/SP Job Entry Subsystem (JES) 2 Version 2 will be available the first quarter of 1983. Its monthly license charge is \$4,000, with an additional \$500/mo for support. The product also has an initial license charge of \$12,000.

The VM/XA Migration Aid carries a \$10,500 initial license charge, along with monthly charges of \$3,500 for basic license and \$500 for support. It will be available the fourth quarter of 1983, according to IBM.

The distributed processing capabilities announced by IBM include the Remote Operator Console Facility (ROCF). When installed on IBM 4300 processors at the remote location and used with appropriate MVS or VM programming, ROCF reportedly can be used for initial microcode load (IML) and initial program load (IPL) operations.

For VM users, operators at a host system with VM/SP Release 2 and

VM/Pass-Through Facility Release 2 can handle IML and IPL operations on a remote 4300 system with ROCF, the vendor claimed.

The VM/SP Programmable Operator Facility and Remote Spooling Communications Subsystem Networking Release 3 can enable operators at a host VM system to control remote VM-based 4300 processors, according to IBM.

ROCF will be available at no charge and installed processors will receive the new function via an engineering modification that will be installed beginning in the first quarter of 1982, the vendor said.

New MVS Releases

The new releases of its current MVS and VM control programming system products and related programming that IBM unveiled are said to incorporate improved operational characteristics and enhanced distributed DP programming.

For users of the current release of MVS/SP Version 1, the enhancements reportedly include support for the new IBM 3880 Models 11 and 13 as well as improved operator control and remote computing functions.

New releases of MVS/SP JES 2 Version 1 are said to include support for the MVS/Operator Communication Control Facility (MVS/OCCF), a program product designed to enable an operator at a host site to control remote, MVS-based 4341 processors.

Enhancements available for users of MVS/SP JES 3 Version 1 include standardized programmer exits and functions, which IBM said can improve performances of 3033 attached processors, multiprocessors and the 3081 processor complex.

All releases of MVS/SP JES 2 Version 1 carry a monthly license fee of \$1,695, including support, until Dec. 31. Release 3.1 will be available the first quarter of 1982, Release 3.2 will be offered beginning the third quarter of 1982 and users can look for Re-

lease 3.3 in the first quarter of 1983. Beginning in 1982, the three releases will be priced at \$1,495/mo each on license and an additional \$175/mo for support.

VM Enhancements

Enhancements to VM control programming are said to offer improved performance in selected operating environments and to provide additional programming, operational flexibility and support for new devices.

The VM/High Performance Option (HPO) was designed as an extension to VM/SP, the vendor said, and is intended to improve performance in 3033 and 3081 processors.

Release 1 of HPO reportedly can improve the efficiency and performance of the VM/Conversational Monitor System on 3081 processors by reducing the programming required to manage data segments shared by multiple users.

Release 2 of this feature supports the new 3081 Model Group K, IBM said, as well as the 24M- and 32M-char. 3081 Model Group D processors. The vendor claimed that, working with a "preferred machine assist" feature, it also can improve the performance of MVS running as a "guest" operating system under VM in 3033 and 3081 processors.

Functions in Release 2 are said to enable users of an MVS guest system to use the 3033 extension feature and to address storage up to 32M char.

IBM noted that support for the new 3880 Model 11 will be available with HPO Release 3, which is said to provide functions that will enable users of the Conversational Monitor System to address up to 32M char. of real storage.

All three releases of HPO carry an initial license charge of \$4,200 and are priced at \$1,400 for monthly license and \$100/mo for support. Release 1 will be available the first quarter of 1982, Release 2 during the second quarter of 1982. Release 3 is scheduled for availability in the first quarter of 1983.

VM/SP Release 2

A new VM/SP Release 2 product that was included in the announcement is said to provide facilities that enhance system usability for DP professionals and reportedly offers improved end-user productivity.

In addition, VM/SP has been extended to provide a programmable operator facility that can reduce system operator messages or redirect them to a host system, enhancing VM distributed DP capabilities, IBM said. VM/SP Release 2 will be available the second quarter of 1982 for a license fee of \$287/mo plus a \$50 monthly support fee.

IBM also announced the availability of MVS/SP JES 3 Version 2 in the first quarter of 1983. It includes a \$13,500 initial license charge and is priced at \$4,500 for a monthly license and \$1,000 for monthly support.

MVS/SP JES Version 1 Release 3.1 is priced at \$2,070 for a monthly license until Dec. 31, according to IBM. Beginning the first quarter of 1982, the product will be available for a \$1,635/mo license fee and an additional \$375/mo for support.

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Univac Streamlines V77s But Adds 50% More WCS

By Tim Scannell
CW Staff

BLUE BELL, Pa. — Sperry Univac has revamped its V77 minicomputer family by scaling down the size and number of printed-circuit boards in a number of its processors and adding 50% more writable control store (WCS) capacity than was available on previous models.

The company also packed more of the V77's internal parts closer together, giving the systems a reported fivefold increase in Cobol performance and a tenfold increase in Fortran performance when the systems are used in conjunction with a floating-point processor.

The results of the revamping are new versions of Univac's V77-500, 700 and 800. The recently unveiled, streamlined processors feature redesigned standard peripheral controllers, an integral data communications multiplexer and I/O expansion chassis and a compact power supply and power distribution center.

By taking advantage of state-of-the-art printed-circuit board technology and decreasing the number of boards in each machine, the firm has reduced the size of all the processors by nearly one-third. For example, a redesigned V77-800 system equipped with 750K bytes of memory, WCS, a cartridge disk unit, a printer and a tape drive requires 12 printed-circuit boards and 12 card slots. Previously, the same configuration used 17 boards and 23 card slots.

To further the streamlining process, Univac incorporated a number of processor functions onto single printed-circuit boards. For instance, the revamped systems have a multi-device controller, resident on a single board, that operates a character printer, a card reader and two asynchronous communications lines. Earlier controller devices required up to four dedicated printed-circuit boards, the spokeswoman noted.

Redesigned Controller

In addition, the V77 cartridge disk and magnetic tape controller have been redesigned to include what Univac termed "buffered interlace controller" circuitry, which previously required a separate board. All controller devices are now mounted in the main processor cabinet.

The systems' expanded WCS capacity is said to allow users more space to write microcode to accelerate the system when used in conjunction with firmware supplied by Univac. Coupled with optional firmware accelerators, the enhanced WCS can reportedly boost the performance of Vortex II, the V77 operating system; Cincom, Inc.'s Total data base management system; and other V77 system-level software.

Currently, up to 2K words of WCS are available on the V77-500; increments of 4K words and 6K words are offered on the V77-700 and -800. WCS capacities are field-upgraded through board swapping.

Finally, since the systems' design approach has resulted in a decrease in overall power requirements, a single 150A power supply does the job of the two 100A supplies needed in

previous configurations.

Available for immediate delivery, a basic configuration of the V77-800 costs \$43,000 and a V77-700 sells for \$36,100. A 256K-byte version of the compact V77-500 costs \$33,500 and the 128K-byte model, \$29,500.

In addition, a series of prepackaged, redesigned V77 systems — designated the V77-550, 750 and 850 — are available and include 256K bytes of memory, a data communications multiplexer, an operator console and the choice of one peripheral disk or disk/tape system. Univac is offering a 10% discount on the total sum of the individual component charges for systems purchased in this way.



Shown above is a compact V77-800 processor combined with rack-mounted magnetic tape drives, a diskette storage system and a fixed disk drive. Housed separately are disk drives, a line printer and CRT terminals.

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'People Have to Manage Within Own Styles'

By Rita Shoor
CW Staff

LONG GROVE, ILL. — MBA courses help and professional management handbooks never hurt. But educational tools do not alter the fact that "people have to manage within their own styles," according to Arlene Mosher, manager of Personal Lines Information Systems (Plis) for the Kemper Insurance Group here.

Overseeing nearly 90 DP specialists of varying experience and skill levels with job titles ranging from programmer trainee to project leader is the sort of task that is apparently a good match for Mosher's personal management style.

The Plis staff handles maintenance and enhancements for several major insurance application systems, including automobile and homeowners policy issuance and account billing. The staff also works in various support areas on more specialized projects such as quality assurance or policy rating.

Another team is devoted to development with a charter to expand the personal lines insurance area in order to supply better user services and to take advantage of state-of-the-art technology.

Keeping in mind the coordination skills required to manage a large group of systems professionals involved in multiple, complex projects,



Arlene Mosher

it is fortunate that Mosher enjoys dealing with people on a day-to-day basis.

Perceiving her basic responsibility as "managing the managers," she finds it especially rewarding to spot someone who seems inclined to move from straight supervision into management.

Drawing a clear line between supervision and management, Mosher said that supervisors tend to be "out there on the front line." They are usually responsible for on-the-job training within a particular applica-

tion system team and are more technically oriented than managers.

Management requires one to "take a broader view of things," according to Mosher. A manager must function as a liaison between upper executive echelons and technical and clerical personnel.

Four Qualities

In Mosher's opinion, four qualities are essential for successfully making the transition to the larger organizational view.

First of these was the need for creativity when approaching management problems. Good managers are constantly searching for ways to improve both projects and people, she maintained. "You cannot take over a position and run it the same way your predecessor did ... Put your own signature on it."

If you wish to tread the management path, you will also need good human relations skills, Mosher said. Patience is essential here since you must be willing to spend the time to learn about each person working for you. Then the knowledge must be applied on an individual basis. "Learn their shortcomings and build on their strengths so they have a good feeling about themselves."

Management Orientation

Third is what Mosher described as "management orientation ... the ability to step away from day-to-day problems and look at the bigger position." A good technician is someone who can spend the least amount of time doing the best job possible. It is the job of a manager to convince perfection-oriented technicians that their primary job is to provide service to the end user without getting hung up on developing "the perfect system."

Finally, tyro managers must learn to be objective when dealing with and evaluating people. They should realize that "sometimes negative feedback is the only way people will grow in their jobs," according to Mosher.

Recognizing the value of creativity, human relations skills, management orientation and objectivity — developing her own management style — began when Mosher graduated from the University of Wisconsin in 1966. Like most people entering the DP field at the time, her major area of scholastic concentration — social studies — was not remotely related to computers.

Nevertheless, she started as a programmer trainee with Kemper in June 1966. Working on a second-generation automobile policy issuance system in an environment that included IBM 7074, 1401 and 1460 machines, she eventually became a technical supervisor.

Responsibilities included administrative tasks such as salary administration as well as technical system proficiency. "The units were small back then ... We weren't grown up enough to have project leaders who were strictly managers," she recalled.

There were fewer than 30 people in Kemper's entire systems and programming (S&P) area at the time. The S&P staff now numbers around

220 people working with two IBM 3033s and two 370/168s. And an IBM 3081 system looms on the horizon, Mosher noted.

In 1970, she returned to a straight technical role as lead designer on the development of a third-generation Automobile Information System (AIS).

By year-end, however, she again assumed a supervisory position on the development team with about 12 technicians reporting to her. This continued through a move of the corporate offices from Chicago to Long Grove until 1972.

After a 10-month hiatus from DP to start a family, Mosher resumed her career in a technical analysis position. Again, it was only a short time before she returned to management. By mid-1974, she was supervising between eight and 10 people involved in developing a workmen's compensation information system.

Technical Switch

There was still one more switch back to a technical spot. That was in February 1977, when Mosher joined a four-person study team formed to kick off development on a new Personal Lines System. By mid-1978, she was back in management mode, eventually moving back to supervise the AIS 40-person technical crew.

In April 1980, the sheer size of the AIS project and the staff it required led to the creation of a new position that placed Mosher at a level separate from other project leaders at Kemper. She assumed her present title in October of the same year and became the sole female company officer in the DP area one month later.

Mosher said it took quite a while to make the final commitment to a managerial career "because I enjoyed the technical role so much." But she tends to agree with the cliché that technical geniuses usually do not make the best managers.

That does not mean that programmers who picture themselves as future corporate executives can safely forget about coding a program that works, she cautioned. "If you don't do your current job well, there is bound to be some question as to how you can perform the next job."

And that first step into a supervisory role still means honing technical skills. Most DP staffers expect immediate supervisors to provide help with technical problems, and inability to provide help to programmers and analysts with technical problems reflects on their image of you as a supervisor, she said. If that happens, "they can cause you to fail" as a supervisor.

Speculating on why males still occupy the vast majority of upper management spots in most organizations, Mosher said that one reason might be a clear sense of direction. These men came into a professional environment "knowing where they wanted to go and what they wanted to do."

Men come into the market "selling themselves from Day One." Women coming on board now are much more in tune with this type of thinking, according to Mosher. This attitude makes an upper executive role a realistic goal for the newcomers.

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Over U.S. vs. AT&T Case

House Committee to Call Baxter on the Carpet

By Jake Kirchner

CW Washington Bureau

WASHINGTON, D.C. — A House of Representatives subcommittee that suspects the Justice Department is not pursuing its antitrust suit against AT&T with sufficient vigor will hold a hearing this week to explore the matter with Assistant Attorney General William Baxter, head of the Justice Department's Antitrust Division.

Last August, Baxter announced that the government would drop its suit if S. 898, the Senate's proposed rewrite of the Communications Act of 1934, was passed by both houses with two amendments. Both amendments had been recommended by members of President Reagan's Cabinet and endorsed by the President.

(The Republican-dominated Senate recently passed its version of S. 898, which is considered much more favorable to AT&T than the measure that chamber considered last year [CW, Oct. 12].)

Four months earlier, in April, at a press conference convened shortly after he was appointed head of the Antitrust Division, Baxter promised to litigate U.S. vs. AT&T "to the eyeballs." He added: "I do not intend to fold up my tent and go away just because the Department of Defense expresses concern" — a reference to an earlier statement by Secretary of Defense Caspar Weinberger calling for termination of the AT&T suit.

One Explanation

One obvious explanation for Baxter's subsequent about-face is that he responded to pressure from the White House. But the subcommittee clearly is not satisfied that his change of opinion was in the public interest. As one subcommittee source put it: "The Justice Department's job is to enforce the laws as they exist; if people want to change those laws, they should come to Congress."

The other issue — whether Baxter's proposal to drop the suit is in the public interest — has already been the subject of correspondence between the Subcommittee on Government Information and Individual Rights, headed by Rep. Glenn English (D-Okla.), and Justice.

Last August, shortly after Baxter announced the Justice Department would drop U.S. vs. AT&T if S. 898 were passed with the two amendments, the subcommittee sent him a list of questions. In essence, the committee wanted to know why Baxter felt that adding two amendments to a pending Senate bill would be equivalent to divesting AT&T of its key components — the remedy the government had been seeking ever since it filed suit against Bell in 1974.

Although divestiture was the original goal, the Justice Department answered, the government now realizes that even if it wins the current case, being tried at the federal district court level, the verdict will be appealed, probably to the U.S. Supreme Court.

"Thus, even if we ultimately obtain the relief we seek, it would not commence until several years of judicial proceedings had elapsed," Robert

McConnell, assistant attorney general for legislative relation, said in a letter to English on Sept. 24.

McConnell said, "The proposed legislative solution would provide relief that was certain and that would not involve the delay likely to occur until final resolution of litigation."

"They must have known all along that whatever verdict was handed down would be appealed up to the Supreme Court," our subcommittee source commented. An "alternate possibility," he added, is that Baxter's change of mind reflects a change in the political climate.

The subcommittee also is not sure the administration has really

thought through its position on the AT&T case.

One stated reason for terminating the case is to maintain a "unitary" nationwide telecommunications network that can respond quickly in a military emergency. But in the area stretching westward from a north-south line drawn through Denver — where much of this country's military counterattack capability is concentrated — a number of sophisticated military communications facilities are provided by nontelephone communications carriers not included in the centralized management group that runs the Bell network.

Another matter that the subcom-

mittee intends to explore at this week's hearing is how the administration views the AT&T case at the moment. S. 898 has passed the Senate, but, according to a subsequent statement by Baxter, the Justice Department will not terminate the suit unless further changes are made.

Specifically, the right of AT&T's competitors to access the telephone network on equal terms must be specified in greater detail, and provisions concerning AT&T research must be clarified to prevent R&D funded with monopoly revenues from being kept secret and/or being embodied in products marketed by the "fully separated affiliate."

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American Computer - hardware & software
IE Systems - communications packages
Martin Marietta - software products
Emules - controllers, peripherals
Com Design - communications hardware
Digital Associates - printer systems
Rantek - colorgraphics
Quodas - software products
Bartlett Associates - colorgraphics
Geo. Hallahan - software, consulting
Perception Tech - voice response
Able - communications, memory
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House Drafting Bill Extending WU Limits

By Phil Hirsch

CW Washington Bureau
WASHINGTON, D.C. — The House of Representatives Telecommunications Subcommittee was scheduled to complete drafting a bill last week that would allow Western Union to offer international communications services. The Senate has already passed similar legislation.

Subcommittee Chairman Tim Wirth (D-Colo.) observed that the bill "establishes a mechanism" linking competition and regulation. "Regulation is an admittedly poor surrogate," Wirth said, "but until there are market forces in place, you don't deregulate."

Wirth's statement is considered a probable reflection of the basic position he and the rest of the subcommittee's Democratic majority will take during the next several weeks as they attempt to rewrite the Communications Act of 1934.

Probably the most controversial provision of the bill authorizing Western Union to operate abroad requires the telegraph company to interconnect its domestic network — which has long been the dominant carrier of tel-

ex/TWX communications within the U.S. — to the facilities of all the U.S. international record carriers (IRC). The IRCs are trying to tighten that requirement.

Eugene F. Murphy, chairman of RCA Global Communications, recently told Wirth's subcommittee that Western Union should not be allowed to offer international services until "fair, equitable, uniform" interconnection has actually been accomplished.

The IRCs are also displeased with a section of the bill that could permit them to enter Western Union's existing market up to four months before the telegraph company goes international. Roger P. Newell, vice-president and general counsel of FTC Communications (formerly French Telegraph and Cable Co.), proposed a one-year moratorium.

"Agreeing to interconnect and providing an actual workable interconnection are two different things," he added. "Judging by Western Union's prior conduct, it... will use every possible stratagem to delay the onset of competition to its domestic telex service."

Experts Say Awacs Planes Not Exactly State-of-Art

(Continued from Page 1)

get the U.S. Air Force Awacs, we feel the Soviets will be flying a second-generation Awacs that is pretty much comparable. It's relatively old technology, and by 1985 it's going to be even older."

Turning to on-board communications equipment, Awacs opponents have criticized their lack of sophistication. These "black boxes" are designed to encrypt all communications to and from the plane, as well as ward off enemy jamming.

The units designated for use by the Saudis are not this country's most advanced. As a result, U.S. senators opposing the sale, led by John Glenn (D-Ohio), are arguing that there is no point in selling the "downgraded" gear, which Glenn claimed is not jam-proof.

The former astronaut has gone on record as supporting the Saudi sale only if the Middle Eastern nation is willing to share joint control and command of the jets with the U.S. A Glenn aide noted that the U.S. insists on joint control and command of Awacs jets flying for the North American Treaty Organization (Nato).

Both military and civilian

experts agree the software is the most advanced and sensitive element of Awacs technology. Originally written by the Boeing Co. in the procedural language Jovial, it is now subject to continual operational revisions, which are performed by members of the Air Force's 552nd Airborne Warning and Control Wing at Tinker Air Force Base near Oklahoma City, Okla.

"Incredibly Difficult"

One civilian expert on military software who asked to remain anonymous called the Awacs software "incredibly difficult to reproduce at best." According to him, the on-board radar programming is a "highly complex, highly sophisticated grid tracking system."

"I don't believe our security would be compromised if they obtained the hardware," the expert said. "I would be less comfortable if they were to obtain the software and the software technology."

If the Soviets were to obtain an Awacs plane, it is "very possible" that the U.S. could alter the software so as to render any countermeasures against it useless, he added.

Survey: Women Programmers Still Slighted

By Ann Dooley
CW Staff

BOSTON — The opportunities for women programmers in the computer industry may be good, but they are not quite good enough. For example:

- Women programmers are paid less than their male counterparts, although they appear to experience less wage discrimination than in the labor force as a whole.
- Significant levels of discrimination creep into the picture when career opportunities are examined. Equally qualified women are less likely to be systems analysts than they are to be programmers.
- Male programmers, on the other hand — while

earning more than females — are not necessarily earning higher wages than males in other job categories.

These are some of the conclusions from a survey conducted at the Center for Survey Research here, using statistics from the U.S. Census Bureau's Survey of Income and Education.

Results from the sample of 674 Massachusetts computer programmers have shown

that the average female programmer is in the high percentile of overall female wages, but male programmers are only in the median percentile level of overall male wages.

Wages Compared

Within jobs, very little wage discrimination was found when salaries of men and women programmers were compared, according to

the survey, which indicated that women's salaries equalled 91% of men's salaries when age and education are controlled.

Significant differences by gender do occur, however, in career growth. Women are more likely to be programmers than systems analysts, the study found when it controlled for age and education.

The shortage of skilled pro-

grammers has created a situation in which competitive wages and opportunity for advancement are available to both male and female programmers, research director Steven Dubnoff remarked, noting that women constitute approximately 19% of the labor force in computer programming.

The published census data used in the survey showed
(Continued on Page 12)

Study to Check Skill, Gender, Job Opportunity

BOSTON — A three-year study to examine "Skill, Gender and Job Satisfaction in Computer Programming" is being undertaken here to determine — among other things — whether men and women have the same opportunities in computer programming.

Funded by the Institute of Mental Health, the research project will use a random sample of programmers taken from census data in Massachusetts — the only state to break data down by specific profession.

The random sampling techniques will provide the "first genuine scientific sample of programmers in the U.S.," according to Philip Kraft, project director and associate professor at the State University of New York at Binghamton.

Scope of Study

The skill, control and responsibility levels that exist in programming; how these factors have evolved since the early days of computing; and who fills these positions — men or women — will be examined by Kraft and project codirector Steven Dubnoff, researcher at the Center for Survey Research in Boston.

The data will be stratified by age, sex and occupation. During the first year, 100 programmers will be interviewed regarding the distribution of jobs, income rewards and responsibility. In the second year of the project, 400 men and 400 women will fill out questionnaire interviews and 100 will undergo in-depth interviews.

Results from the research are expected to be formulated by mid-1984, according to Kraft.

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Commodore Exec on Micros: Now What?

By Tim Scannell
CW Staff

BOSTON — The microcomputer industry today is a lot like the dog that has been chasing cars up and down the street for years — and finally catches one.

"He's gotten a lot of practice, but now that he's caught one he's got to figure out what to do with it," H.E.

James Finke, president of Commodore International Ltd., said.

Finke and six other industry leaders gathered here at a recent forum for a panel discussion on the future of personal computers.

Finke opened the forum by stating that there is absolutely no doubt the microcomputer industry has grown

and continues to grow by leaps and bounds. For instance, he stated somewhat tongue-in-cheek that the current personal computer market is about the same size as the total potato chip market, next year will be about half the size of the pet food market and is fast approaching the total worldwide sales of panty hose.

Obstacle to Growth

However, the industry's growth is still hampered by an "MIS [management information systems] manager mentality," Finke warned the overflow crowd at the forum. Users and vendors are still tied up in the technological jargon inherent to computing. Consumers will not continue to accept computers into their homes unless there is a "Vatican II of computer technology" whereby vendors drop the current vernacular and adopt a more natural and understandable style, he added.

Finke said vendors will eventually establish a "meaningful" service plan and even remote dial-up di-

agnostics that will allow users to get total satisfaction when their system "goes bump in the night."

William H. Gates, president of Microsoft, Inc. and developer of Microsoft Basic, also talked about the need for computer simplicity, but aimed a few remarks at the 16-bit microcomputer. "Software is a game of repetition," he said. But, 16-bit computers like the recently introduced IBM personal computer can cause problems with compatibility.

In the early years of microcomputing, as new hardware was developed, software changed frequently. However, most people have now built up software libraries based on the 8-bit architecture and "might not want to shake out that stability," he explained, adding that the 16-bit microcomputers are viewed by some people as a threat to established compatibility.

'Detached DP'

Jon Shirley, vice-president of Radio Shack Corp.'s Computer Merchandising, pre-

dicted the emergence of detached data processing, or using computers to process data that is used by just one department in a large firm. Tandy Corp., he said, is in the process of installing its TRS-80 disk-based computer systems in each of its 4,000 retail stores in the U.S. The computers will be used for detached processing and to communicate inventory and billing information to the firm's central computers in Fort Worth, Texas.

Shirley also stated that, because of their low cost, personal computers will play an increasing role in office automation as stand-alone workstations. For the future, microcomputers' memory storage will continue to increase, mainly through the use of hard disk systems that will eventually be linked together and shared.

Philip D. Estridge, director of IBM's Entry Business Systems and unofficial creator of the firm's personal computer, confined most of his product-related comments to broad generalities and offered only a few personal opinions on emerging technologies.

For instance, some time within this decade, speech synthesis and recognition will become an everyday part of personal computing, Estridge said. Although the process of merging the data of computers with the pictures supplied by videodisk "needs a lot of work," that technology will come faster than expected, he noted.

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Study of Programmers Finds Women Slighted

(Continued from Page 11)

that 23% of programmers are female, compared with a figure of 14% for systems analysts, demonstrating the difficulty women continue to face in climbing up the career ladder.

The survey's salary data was based on hourly wage figures. It was found that the biggest factors in income related to age, followed by occupation and education; sex is a marginal factor, the survey indicated.

The survey showed that the median female programmer commands earnings in the upper decile of the distribution of female earnings overall. Data can be interpreted as showing that 98% of females work in occupations in which the median annual earnings are lower than the median earnings of computer specialists. And most of the occupations in which higher median pay for fe-

males is recorded often have higher or more rigid educational requirements as well.

The survey concluded that while women are better off in computer programming, they still do not get an even break.

Correction

In the story, "Software Enhancements Prove the Rule at Info 81" [CW Oct. 19], Version 6.3 of the Foresight financial modeling package, mentioned in the article and introduced at the show, is a proprietary product of On-line Systems, Inc., not On-line Software International, Inc.

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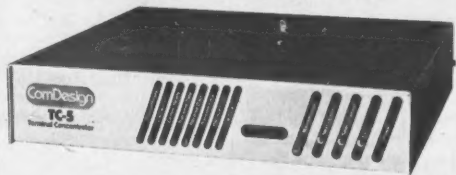
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Its President Tells Forum

Apple Computer to Remove Software Protection

By Tim Scannell

CW Staff

BOSTON — Apple Computer, Inc. will try "to diligently eliminate what is now commonly referred to as 'software protection,'" its president told a mildly shocked audience here recently.

Speaking at a recent forum here that focused on the future of personal computers, A.C. "Mike" Markkula took an unconventional stand by stating that software protection — which is presently aimed at defining and guarding a program's content from software pirating — will eventually "go away completely." Instead, more emphasis will be put on how much it actually costs to package and distribute a program and less on software's hard-to-define coded content.

"Users should be allowed to have as many copies of a software program as necessary to do the application," Markkula said, pointing out that companies are spending too much money trying to protect something that is hard to protect and even harder to classify with a dollar figure.

While Markkula's statements sent mild shockwaves through the crowded auditorium where the forum was held, it caused more than one industry leader sharing the panel scurrying to counter his controversial views. Among his opponents were executives from two of the top microcomputer companies and an official from IBM.

Overflow Crowd

Held in conjunction with the Northeast Computer Show and sponsored by the Boston Computer Society — the nation's largest nonprofit personal computer association, the forum drew an overflow crowd of computer buyers, sellers and aficionados and included a number of leaders in the microcomputer industry. Members of the panel included H.E. James Finke, president of Com-

modore International, Ltd.; Philip Estridge, director of IBM's Entry Systems Business and unofficial creator of IBM's recently introduced personal computer; Peter Rosenthal, director of business planning and development for Atari, Inc.; Jon Shirley, vice-president of Radio Shack Computer Merchandising; William H. Gates, president of Microsoft; and Nigel Searle, executive vice-president of Sinclair Research Ltd.

While most of the panelists, reading from prepared texts, offered some forecast on what track personal computing would take in the coming years, Markkula chose to deviate from the expected by offering his opinions on software protection.

For example, one idea Markkula offered was to weigh software's worth on the scale as that of a paperback novel. Book publishers set pricing according to how much it costs to print, promote and market a novel, rather than what is written on its pages. To make things easier, software should be rated the same way.

However, Atari's Rosenthal disagreed with his comments, noting that his firm is currently pushing hard for software protection legislation — the kind that protects a program's content — and spends a great deal of money trying to protect its software from program pirates. He countered that although a book's price is based on how much it cost to produce, its aesthetic value is based on what is contained between its covers. Likewise, software's worth should be based on its content, by what appears on a CRT screen, and not just on how much it costs to market.

Atari is one of the few firms that advertises that it will pursue and legally prosecute anyone caught copying its software, which presently consists mostly of video games.

IBM's Estridge pointed out that the biggest threat to software is illegal copying — not just because it is

ing to a spokesman.

Coincidental with the joint announcement of the progress in the acquisition, Memorex revealed it had agreed in principle to sell or lease the assets of its Consumer Products Division to Tandy Corp.

Although the company did not reveal the financial terms of the agreement, it noted the divestiture would involve a combination of cash and notes. With revenues of \$70 million last year, the division accounted for a little less than 10% of Memorex' 1980 revenues.

Under the proposed arrangement, Tandy can market the audio and videotape cassette products under the Memorex name.

In addition, Memorex announced improved operating results for its third quarter. The firm sustained a loss of \$2.3 million or 46 cents per share, compared with a loss of \$5.6 million or 88 cents per share in the same period last year.



CW Photo by T. Scannell

Apple Computer, Inc.'s Mike Markkula listens as IBM Director Philip D. Estridge rebuts Markkula's controversial views on software protection.

wrong or a financial headache to the unwilling donor, but because it will prevent creative people from being creative. He added that current methods to prevent software pirating, such as owner registration cards and signed pledges of ethics and honesty, will not work.

Radio Shack's merchandising vice-president, Jon Shirley, also disagreed with Markkula's views, pointing out

that software has a lot of hidden costs, such as support and training, that have to be included in each package's sale if the originating company is to make a profit.

The bottom line is that a company's reputation is riding on each package it develops and it would risk that reputation if every user were allowed to indiscriminately copy or even alter a program, he noted.

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Burroughs Trims Original Offer To Buy Memorex by \$4 Million

DETROIT — Burroughs Corp. is proceeding with its plan to acquire Memorex Corp. now that Memorex has reached a debt restructuring agreement with its lenders.

But Burroughs has reduced its offer of \$14.50 per share for Memorex stock to \$14, which will result in a purchase price of about \$101.5 million. That trims the original offer by about \$4 million.

Neither firm would discuss the restructuring arrangement or the reason for the decrease in the purchase price. The difficulty Memorex had renegotiating its \$223 million debt with some dozen lenders was reportedly the reason acquisition talks, started in August [CW, Aug. 10], had been stalled.

Both companies' boards of directors have approved the terms of the acquisition. Memorex stockholders still have to approve the acquisition. The company has scheduled a shareholders' meeting for December, accord-

Builders Face Off Over Dallas DP Trade Center

By Bill Laberis
CW Staff

DALLAS — The fabled gunfight at O.K. Corral is headed for a modern-day remake here as two real estate developers race against the clock and one another to build the world's first computer trade center.

Each claims to have the inside track. Each claims his center will be completed before the other's.

And each says that this town and any other just ain't big enough for the two of them.

"This is going to be a foot race right down to the wire," said Trammell Crow, whose family-owned development company recently announced it will begin building the 500,000 sq-ft Computer Mart next March.

"There is simply not room for the both of us."

Crow's rival, Boston-based Leggat McCall & Warner, is planning a mid-December ground-breaking for its International Information Center in Las Colinas, a Dallas suburb [CW Oct. 5].

Neither developer holds a free and clear title to the land on which they will build. Neither has any written commitments from the computer companies the developers have been courting to lease permanent computer display space. And neither seemed to know much of the other's plans until recently.

Both Moving Ahead

Yet both developers are moving forward with guns barking, knowing full well only one can be successful in the \$60 million-plus ventures, with no guarantee of success even for the survivor.

Crow's Computer Mart is slated to be built on a 25-acre site currently oc-

cupied by an aging football stadium that the city is now demolishing. Crow said his family purchased the land at an auction two years ago and title to it will be transferred from the city March 1, 1982.

Crow said that outright ownership of the land is "in the bag" and that financing of the mart will be "no problem whatsoever," saying his family's \$300 million real estate empire can finance the project on its own, if need be.

Like Leggat's planned center, the Computer Mart will be designed to provide users with a one-stop computer shopping location where upwards of 200 vendors will display their wares in permanent, leased showrooms. Each developer hopes his center will become the focal point of user-group meetings and miniconventions.

The Computer Mart will be situated next to the Crow family's 135-acre Dallas Market Center, which houses a home furnishings mart, apparel

mart and other commercial marketplaces.

Crow added he has received "a good deal of verbal support" for the mart from computer industry heads. He is planning an aggressive "very intriguing promotional campaign" aimed at computer manufacturing executives.

In assessing his relative position, Crow said the Computer Mart will succeed because of its proximity to Dallas' hotels, some of which his family built and owns. On the other hand, Las Colinas is a well-planned community "that right now lacks the support facilities to make this kind of thing go," Crow said.

Leggat sees the situation altogether differently.

"Both centers just won't be built in Dallas because both won't be financed," Brad Griffith, senior vice-president with Leggat, said. "The tenants aren't going to go to both, too, that's certain. We're going ahead as planned."

Griffith claims Leggat's International Information Center will reign supreme because of the number of oral commitments he said Leggat has received from vendors.

"We are far enough along with the commitments process such that, if they [vendors] are going to come to a center in Dallas, they're going to come to ours," Griffith maintained. "We are in the final stages of negotiations for financing. It's a race to the finish, no doubt."

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DEC Gives MPU Option to VT100, Enters Personal Computer Mart

MAYNARD, Mass. — Digital Equipment Corp. recently introduced an add-on microprocessor option for its VT100 terminal that allows the unit to be used for stand-alone office and personal computing applications.

Presently, there are about 250,000 VT100 terminals installed worldwide.

Billed as DEC's first offering in the personal office computer market, the VT18X package consists of a Z80-based microprocessor module with 65K characters of internal memory, a dual minifloppy disk drive with 160K characters of data and program storage and connecting cables. The option allows the terminal — which is basically an I/O device to a host computer system — to run Digital Research, Inc.'s CP/M operating system.

At the same time as DEC's announcement, Lifeboat Associates, an independent software developer based in New York, reported that it will provide more than 100 applications programs for the VT100 with the VT18X option.

The VT100 option will be sold as a kit for current VT100 users and serviced primarily through the company's 25 computer stores and through its sales offices, a DEC spokesman said. In addition, service will be provided through DEC's field service organization and recently opened carry-in center in Maryland.

As part of the add-on package, users will be supplied with a diagnostic disk to check system performance and perform self-analysis functions.

Software available for the revamped VT100 from independent distributors includes word processing, mailing list, financial modeling and statistical packages and communications to external data bases. A set of high-level languages is also available for users that want to develop their own programs, the spokesman noted.

The VT18X option costs \$2,400, plus

an extra \$250 for the CP/M software license and documentation and will be available the first quarter of 1982. A second minifloppy drive is available for \$1,275. The vendor can be reached at 146 Main St., Maynard, Mass. 01754.

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Could Improve Field Maintenance IBM, Stanford Join Forces on AI Project

By Jeffery Beeler

CW West Coast Bureau

PALO ALTO, Calif. — IBM and Stanford University have embarked on an artificial intelligence (AI) research project that could improve the speed and effectiveness with which vendors maintain their system in the field.

The aim of the collaboration is to codify the knowledge of one or more recognized experts in the field of intersystem fault diagnosis. That know-how is then expected to be captured into a "knowledge-based" system that someday will automatically and expertly diagnose bugs in networks of communicating modules like CPUs, disk units and channels.

The result will be a Diagnostic Assistance Reference Tool (Dart) that will enable hardware vendors to replicate the expertise of their best field-service engineers and distribute that knowledge to user sites where it might otherwise never be available.

Dart's conception comes at a time when "expert-systems" technology is increasingly gaining vendor acceptance as perhaps the only workable solution to today's acute and growing shortage of technically qualified field engineers.

Philosophies Differ

Although IBM and Stanford are ostensibly involved in the same artificial intelligence research project, they are pursuing their own special interests and have adopted somewhat different design philosophies.

IBM, for its part, is developing an expert system based on relatively established technology scheduled to yield its test results by the year's end.

Stanford, by contrast, is venturing into the realm of state-of-the-art technology and is still in the process of developing its own primitive Dart prototype, according to Dr. Michael Genesereth, a professor in the university's computer science department. By next June, the prototype is expected to be complete, at which point IBM and Stanford will decide whether their parallel research efforts should be merged.

In conception, Stanford's version of the proposed Dart aid marks a sharp

Hinchman to Review Regulatory Changes

OAK BROOK, Ill. — Walter Hinchman, former chief of the Federal Communications Commission's (FCC) Common Carrier Bureau, will conduct a one-day briefing on current regulatory developments on Nov. 18 here.

Sponsored by *Business Communications Review* (BCR), the briefing was designed to provide a comprehensive overview of what is likely to happen in telecommunications at both the national and international levels.

Hinchman will discuss the FCC's steps toward deregulating major portions of the industry and congressional action on the rewriting of the Communications Act of 1934.

The registration fee is \$225, BCR said from 950 York Road, Hinsdale, Ill. 60521.

departure from more traditional expert-system approaches, which are probably best typified by Mycin, an artificial intelligence tool for diagnosing infectious diseases. Developed at Stanford several years ago, Mycin contains dozens of diagnostic and therapeutic "rules" that distill the knowledge of a noted infectious-disease expert and enable the system to identify illnesses by associating them with their corresponding symptoms.

The drawback with Mycin and other rule-based expert systems is that they lack even an elementary understanding of their assigned subject matter. "If you asked Mycin why a particular rule was included in its knowledge base, the system would be unable to tell you," Genesereth explained. "If it were presented with a problem it had never encountered before, the system would be stuck."

To overcome Mycin's inherent limitations, Genesereth and his Stanford colleagues rejected the familiar rule-based approach in favor of a design model that would describe in general how computing configurations run and why they work that way. When fully assembled, the contents of such a model will be independent of problem diagnosis and will reportedly impart to the Dart system a deep, basic "understanding" of information-processing operations.

The Stanford researchers also plan to link their design model to a general diagnostic program that is still undergoing development. Using diagnostic rules that are particular neither to the type of module being analyzed nor to the problem being remedied, the program will someday be able to operate on the design model, analyze the symptoms of an ailing system, interrogate a human operator and then identify the hardware bug at hand, Genesereth predicted.

Stanford Offers Flexibility

Although the Stanford researchers deliberately made their diagnostic program as general as possible, the system does have the flexibility to accommodate very specialized fault-finding rules that apply to only one type of configuration. "If we do our work right," Genesereth said, "the addition of the specialized rules should significantly improve the general diagnostic program's efficiency, provided of course the system is running on the right kind of hardware."

Most of the model-based system's software is written in Lisp, a favorite programming language among artificial-intelligence researchers, and is currently running on either a Digital Equipment Corp. VAX-11/780 or the vendor's Decsystem-2060.

Because IBM's hardware is seldom renowned for its ability to run Lisp programs, the same two DEC processors are also used to support the industry giant's own version of the Dart system.

IBM 'Rule-Based' System

In contrast to its Stanford counterpart, the IBM system derives most of its intelligence from a set of rules that, like Mycin's, associate specified

ailments with their characteristic symptoms. The IBM system "already contains enough of a knowledge base to direct a dialog with a human operator and elicit the right kind of information to meet its requirements," according to Dr. Paul Friedl, acting director of the company's local scientific center. "If it can do so, the system will infer a problem without asking a user for any informa-

tion."

At present, the system's expertise in digital fault diagnosis extends only as far as teleprocessing environments. But within its own narrow field of specialization, the rule-based system already exceeds the competence of relatively inexperienced field engineers, although it still lacks the troubleshooting skill of a true expert, Genesereth said.

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Speaker Sees DP Eliminating Audit Profession

By Bob Johnson

CW New York Bureau

NEW YORK — Data processing will eliminate the auditing profession as it now exists because all future auditors will be DP auditors.

Nearly 150 professional auditors, members of the New York chapter of the EDP Auditor's Association, heard that message here last week at a conference designed to educate them about computer technology, from on-line auditing to the integrity and security of data.

Stan Halpern, a consultant with Coopers & Lybrand's Computer Group, discussed the DP auditor's professions both believed that computers were only going to be used by large companies. "The DP people of the 1950s were amateurs, as were the early DP auditors. Feeble attempts at DP audits have matured and grown into practiced methodologies," Halpern said.

Halpern stressed that the DP auditor must continue to understand computer technology and improve his technical communications skills. Failure to do so, he warned, will leave many auditors out in the cold.

Halpern told conference attendees

that they should address the problems arising from the proliferation of DP, especially with the advent of mini- and microcomputer systems. One key problem for the DP auditor is how to approach operating system security for the smaller systems, he said.

Halpern also said that the public as a whole distrusts computers and that auditors should make it their business to understand why. The proliferation of legislation to support this distrust will make the auditor's responsibility of being a corporate watchdog all the more important, according to Halpern. "The future of computers will contribute more to audit efficiency. The true mark of the professional will be keeping up with the technology."

Security Compromise

Belden Menkus, an independent consultant, told attendees that data security represents a compromise between the maximum use of computer systems and the protection of assets. "You cannot protect assets and maximize system use," Menkus said. "And anybody who offers data security software and says that it will protect you is falsely leading you."

Menkus described some problems commonly faced by DP auditors when trying to secure data. Magnetic tapes are an example. According to Menkus, there is no way of telling whether or not a magnetic tape has been tampered with. "By their nature, they are too easy to alter. Even if we find the tampering, the problem is to produce evidence. We can't even demonstrate for sure that we have an error."

Abstract systems design makes it difficult to pin down problems and thus poses another obstacle to securing data, Menkus said. "We have tended to create programs that exist

in the environment of the machine and are not tied to reality. It is quite possible to audit files and programs that look fine, but in reality, assets are missing," he explained.

The farther away from reality machine design or software is, the harder it will be for the DP auditor to determine the true status of assets, Menkus added.

There are only two ways to secure data, Menkus said. The first is to isolate it from threats and the second is to hide it from those who want to get at it. Access control will do the isolation job and encryption will help to shield it from the "bad guys."

Auditing Profession Spawns Computer System of Its Own

By Bob Johnson

CW New York Bureau

NEW YORK — Responding to the call of technology, the auditing profession recently spawned a computer system of its own.

Arthur Young & Co., one of the country's "Big Eight" accounting firms, recently introduced its microprocessor-based, stand-alone Auditcomputer, to be used by the company's international network of branch offices.

Designed to perform client accounting and auditing functions, the Auditcomputer can receive and process data transmitted from any type of DP system, according to the company. Data can be transferred to the system by means of magnetic tape, standard communications lines or IBM 3740 floppy disks, the firm said.

In addition, the system will enable auditors to better detect fraud in clients' books because the moving of data from one system to another will reveal any programmed commands designed to breach security, the spokesman claimed.

Three Major Modules

The Auditcomputer consists of three major modules that include an Apple, Inc. Apple III microcomputer with 128K bytes of memory on two 5¼-in.-floppy disks, a Corvus Systems, Inc. 20M-byte mass storage unit and a Dynabyte, Inc. 5300 or Altos Computer Systems, Inc. 208K-byte remote data capture unit. An Anadex, Inc. dot matrix printer, capable of printing 200 char./sec, is also part of the system.

The Dynabyte 5300 will run under the Digital Research, Inc. CP/M operating system, the company noted.

The system will sell to branch offices for about \$20,000 and is now operating on a test basis in eight Young branch offices.

According to Young's director of computer auditing, Rick Richardson, the nature of the accounting and auditing profession dictated the need for this type of system. He said the trend of the mid-1960s and most of the '70s was aimed at the development of audit test software packages designed for use on large mainframe systems. Nothing was available for auditors that was less time consuming and more efficient, he noted. "Most of it was Cobol and machine language-based. Accounting firms

were dependent on service bureaus for machine time and they had to worry about their clients' software compatibility with the hardware being used," he said.

However, the advent of the mini- and microcomputer offered new possibilities. Micros were being used in conjunction with time-sharing on larger systems, but a dream of audit independence was envisioned utilizing these smaller systems, Richardson noted.

He said the new smaller systems with their varied languages had new operating requirements, but in comparison to converting existing software originally designed for large systems — which would have entailed staffing and more expense — the small system route seemed more desirable.

"We took a look at Pascal and determined that it could be used for the auditing function and then we looked at the available hardware, which was now more accessible," Richardson said. This was weighed against having to develop new programs and negotiations with many vendors, he added. "A move away from audit software to audit hardware was developing," he commented, and the Auditcomputer was planned.

Richardson explained that the Auditcomputer will allow the Young branch offices to do administrative work as well as auditing tasks.

Book Tells Where To Sell Programs

BETHESDA, Md. — A book entitled *Software Wanted: How and Where to Sell Your Program* is available from Battery Lane Publications here.

The guide is intended to bring software authors and marketers together. It resulted from a survey of software publishers and distributors to determine what kinds of programs they buy, what royalties they pay and which ones offer help with programming and documentation, the firm said.

Information on more than 60 companies is provided, as well as tips on what to look for before signing a contract.

The book is being sold for \$25 on a money-back guarantee basis from Battery Lane Publications, P.O. Box 30214, Bethesda, Md. 20814.

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For Systems Department Speaker Outlines Four Ways to Implement MIS

By Brad Schultz

CW New York Bureau

NEW YORK — The systems department can go one of four ways in implementing a management information system (MIS), a recent Info 81 session was told here.

One way is to bail out, explained David G. Robinson, a principal at Index Systems, Inc. in Cambridge, Mass. Besides stopping the implementation in its tracks, the system department can elect the traditional, participative or authoritative strategies, he stated.

Traditional implementation allows the MIS developers to proceed at their discretion, subject to periodic review by the organization's senior management, Robinson said. This review normally involves evaluation of reports submitted by the systems department, detailing progress toward implementation milestones and whether serious problems have emerged.

Participative implementation calls for "bottom-up" review by end users, Robinson noted. End users, therefore, share responsibility for the implementation with systems professionals. Approval of the MIS is registered up the chain of command until final sign-off by the organization's top management.

Authoritative implementation calls for "top-down" review, so top management initially approves each stage of the MIS development and then delegates authority to approve components of each stage, Robinson indicated.

According to the principal of Index, which is a management consulting and systems development firm, MIS developers should initiate their selection of an implementation strategy by deciding whether their organization's "senior management context" can sustain what the MIS will really do.

The value of an MIS is not in the system itself, Robinson observed; value lies in the system's impacts on the organization. By senior management context, Robinson meant the array of concerns, attitudes and political and budgetary limitations that shape top management's tolerance of organizational change.

'Bail-Out' Strategy

If this context is inadequate for the MIS, developers should select the "bail-out" implementation strategy. The MIS would then be scrapped.

If the senior management context is perceived as adequate for the MIS, systems developers should discover whether the organizational change mandated by the MIS would proceed slowly or quickly. Developers should opt for traditional implementation if the MIS — for which the senior management context was deemed adequate and the necessary pace for change was considered slow — would not require end users to substantially change the way they work. But the participative strategy for implementation is warranted if end users would have to change work styles significantly.

What if fast organizational change would result from the MIS? Again,

systems developers should determine whether end users would need to change work styles very much. If much change would be necessary, then developers should either bail out on the MIS or undertake a cautious participative strategy, Robinson said.

son said.

But if end users would not need to change work styles very much, either an authoritative or traditional strategy is warranted, he declared.

MIS developers should allow for a process of "change management" while they develop the system. While the systems department studies feasibility of implementation, it should assess the senior management

context by drafting a preliminary organizational impact statement.

The next stage in MIS development is to specify MIS functions while deciding which implementation strategy to adopt, Robinson maintained. Next would come the actual implementation, followed by maintenance of running the MIS while organizational impacts are regularly studied and negative impacts are resolved.

How Will Users React?

NEW YORK — Five factors determine how users will react to a new management information system (MIS) — a reaction that will determine the system's overall success, consultant David G. Robinson told an Info 81 session here recently.

The factors are organizational structure, supervisory management, nature of tasks and work flow, "work culture and psychological contract" and technology.

Systems fail when users cling to old work habits, management demonstrates no commitment to change or users resort to sabotage, Robinson observed. A study of 18 MIS that were considered technically adequate found only three to be successful (eliciting favorable user reactions), he declared.

Organizational structure lowers chances of MIS success when an old structure inhibits attempts at changing work styles, Robinson asserted. This factor also works against MIS success when departments of the organization resist integration, although implementation called for it.

Change Blocked

Supervisory management (administrators devoted to telling staff what to do and ensuring that they do it) spoil MIS when they adopt a "hands-off" approach to the consequences of implementation. This second factor can also undermine MIS when senior management (administrators devoted to decision making and overseeing supervisory management) does not transmit a sense of commitment to change, Robinson said. Management politics can block change.

As for the nature of tasks and work flow, inadequate attention to details of new tasks and insufficient training hurt MIS implementations, the session was told.

The fourth factor — work culture and psychological contract — was defined as what people believe their work means and how they perceive their relations with the organization itself, the organization's relations with the world and their relations with other people in the organization.

This factor sours MIS when "old expectations are ruptured," informal relationships are forced to change and management must find new ways of motivating subordinates and staff, Robinson noted.

Finally, technology pulls the rug from under MIS implementations when the system fails to do the job, its design optimizes on cutting-edge technology or its design is not user-sensitive, Robinson concluded.

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Prof: DP Bombarding Staff With 'Harmful Stress'

By Bob Johnson

CW New York Bureau

NEW YORK — Computers and other automated equipment are bombarding office workers with harmful stress, according to a professor of management who spoke at Info 81

held here recently.

Dr. David Cirillo of Suffolk University in Boston directed a session designed to help managers understand the stress factors now being experienced in their automated offices because of technological advances.

vances.

Many office workers who were previously in clerical jobs and interacting socially with other people are now finding themselves thrust into a new machine-oriented environment, Cirillo stated. Because managers and the organization as a whole feel that computers, word processors and other advanced machinery will boost a company's productivity, the clerical worker now becomes a computer operator.

"The machine operator or user is put in front of a screen and is told to learn the new technology. It doesn't matter in many cases whether or not he finds the job boring or unenjoyable," he said.

Machine Ghettos

Cirillo pointed out that when workers are put into a room full of machines and have little social contact, stressful situations can and do occur. "Offices can become machine ghettos," he warned, explaining that even though the most highly advanced equipment is available, worker productivity can drop because of the stressful conditions that may prevail.

A loss of control over one's environment is a major cause of this stress, according to Cirillo, who called it "machine pacing." Someone sitting at a terminal or workstation must constantly monitor what the

machine is doing and respond to its whim. This "pacing" can become extremely uncomfortable because most people simply do not like to be paced at their work.

A good deal of the blame for stress in the automated office rests on the shoulders of management. Managers give too much attention to machines and not enough to humans, according to Cirillo. "The military has been aware of this problem for quite some time, but it has not crossed over into the private sector."

He added that not enough attention is paid to the physical environment when a decision is made to buy machinery and to create the necessary work space. "Simply stated, the needs of the people are not being met by management."

Management should concentrate on the "hostility rate" of workers when planning and doing feasibility research, Cirillo said. He noted that there is little human involvement in feasibility studies and that the inclusion of it could lessen the "burnout rate" said to be prevalent among computer machine operators. Cirillo cited the example of secretaries in Finland who are directly involved with the selection of machines and the design of their working environment; as a result, they experience less stressful situations. He said this is a lesson from which U.S. management should learn.

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DPMA Curriculum Author Outlines Job Future for DPs

By Brad Schultz

CW New York Bureau

POMONA, Calif. — The principal author of the Data Processing Management Association's (DPMA) curriculum model has released new information on what programmer/analysts will need to know for jobs in the 1980s.

Dr. Thomas H. Athey chaired the DPMA Executive Committee on Model Curriculum Development, which completed a final draft of its model for education in computer information systems late this summer. Computer information systems is what DPMA has decided to call the study of DP, for which the professional society expects to have new objectives in years to come.

Real-World Curriculum

In releasing a final report on the DPMA model, Athey told *Computerworld*, "Upon review, you will see that the curriculum is real-world, emphasizes applications development (not compiler theory and so on) and requires the students to have a good business background and be able to present their ideas verbally and in written form."

Athey heads the department of computer information systems here at the California State Polytechnic University. Culminating a development effort that had a dozen separate project leaders, the model curriculum was described in a recent CW In-Depth article [CW, Sept. 21].

According to the report, "programmer/analysts who enter industry in

the 1980s will encounter a dramatically changing technical environment, which will demand changes in the way systems development has been carried out in the past." Several trends were identified:

- Computer information systems are moving rapidly toward utilization of transaction-oriented data base systems, requiring systems professionals to understand data communications, distributed DP and the organizational dynamics of implementation.

- Nontechnical users will become directly involved with DP and data entry.

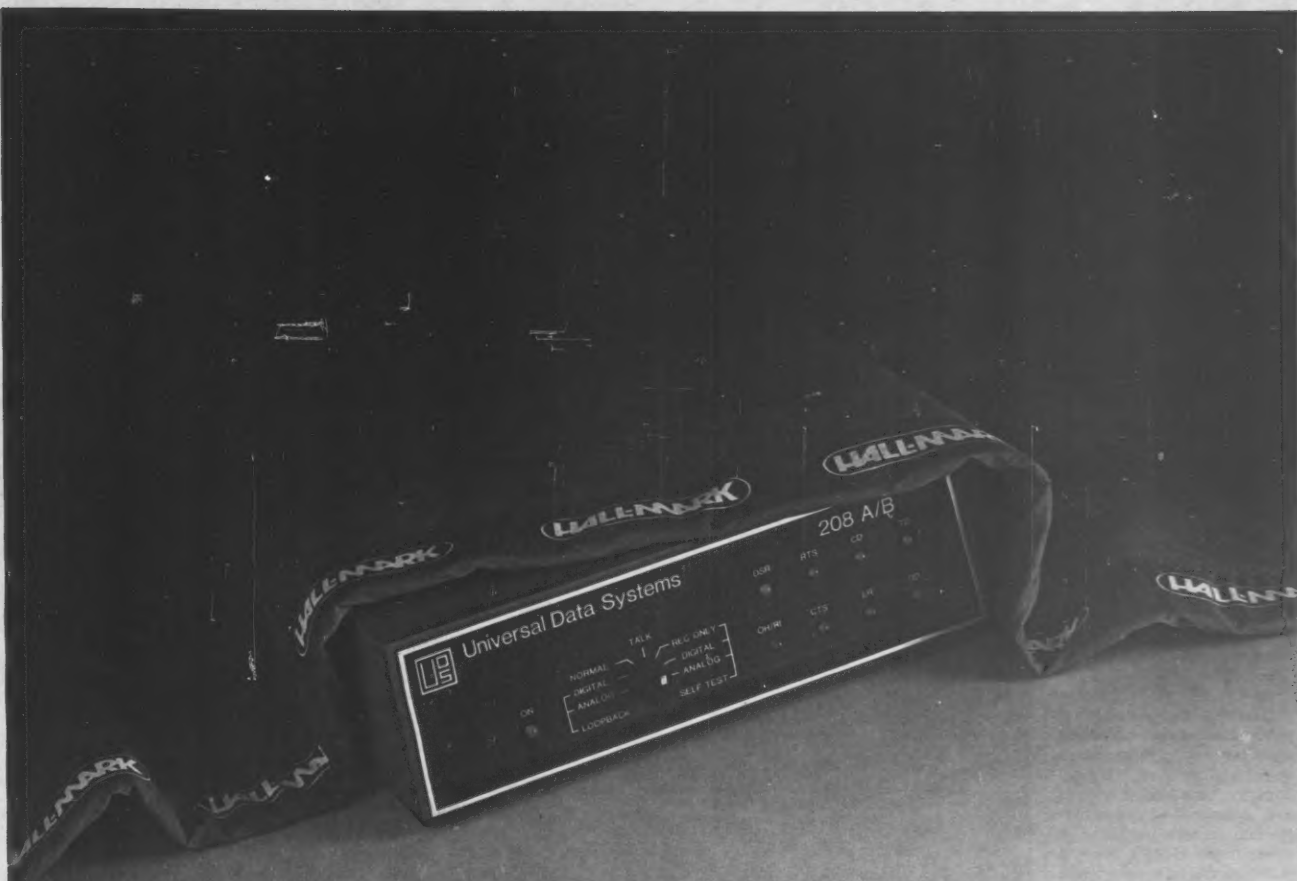
- Minicomputers and microcomputers will be as important as mainframes in supporting computer information systems applications.

- Systems developers will need sophisticated development tools and will rely heavily on the techniques of structured programming.

- Assembly languages will fall by the wayside. Cobol will continue as the dominant commercial language, but "user-friendly" query and report writer languages will proliferate among nontechnical users.

- Programmer/analysts will advise managers on whether to buy software or write it in-house.

- The computer will continue to deliver operational applications, such as number crunching, data tabulating and record building. But a new range of applications will emerge with far-ranging organizational repercussions — the applications of decision support systems.



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Graphics Seen Easing Busy Executives' Time

By Bob Johnson

CW New York Bureau

NEW YORK — Computer graphics as a complement to executive information systems will be one of the single most important contributions to productivity in the near future.

This was the general consensus of a panel that addressed the use of computer graphics for executive decision support at an Info 81 session here recently. The panel, made up of four speakers from different sectors of industry, gave an overview of how information systems can ease the decision-making process executives face daily. Talk concentrated on interactive computer graphics and how it has made possible the analysis of data previously done by techniques involving paper handling.

Legwork Cut

James C. Cupec, assistant vice-president of corporate management information systems at the First National Bank of Chicago, described the executive information system installed there. A study he conducted showed that in decision support, 90% of the effort is involved in data gathering and only 10% in actual analysis. With computer graphics, much of the legwork can be cut down so that the executive has more time to make decisions.

"The needs of management must be taken into account when setting up an executive information system to determine how graphics can best serve them," he said.

The graphics industry today is realizing that when executives have easy access to computer graphics, more charts and visual aids will be used for analysis and presentation, the panel explained. The most important aspect of any executive information system is its ease of use, according to Cupec.

When graphics is incorporated into an information system, it must be understood that executives want an English language command system and the use of a light pen. "Executives have an aversion to typing at a keyboard. They just don't like doing it," he said.

Craig Smith, director of systems consulting at Mathtech, Inc., presented a case study on the use of computer graphics in the boardroom of Esmark, Inc. to illustrate the information readily available at an executive's fingertips. Esmark executives who deal with huge amounts of data were found to benefit directly from the graphics displays

and charts in the boardroom.

However, it was revealed in the case studies that although computer graphics can play an extremely important part in executive support systems, it sometimes simply is not used. Executives must be made aware of the importance and productive benefits that graphics can offer, the speaker said.

Video Courses Focus on Micros

SANTA MONICA, Calif. — Two video courses for data processing and electronics professionals have been announced by Integrated Computer Systems, Inc. (ICS) here.

The first course, "Software Engineering for Micro and Minicomputer Systems," is targeted at technical managers and project and design engineers who need assistance in managing real-time micro- and minicomputer-based projects from design through implementation.

The second course is an introductory, self-paced course entitled "Microproces-

sors and Microcomputers."

Each course is a full-color, studio-produced video program that enables companies to train up to 25 technical employees internally. They may be purchased for \$6,850 or rented for two months at \$2,350. The course package includes a 7½-hour video tape; one administrator's manual; 15 participant study sets comprised of workbooks, supplementary reading and guidebook; and a final exam. Additional information is available from ICS, 3304 Pico Blvd., P.O. Box 5339, Santa Monica, Calif. 90405.

Good news for 3270 users.



Lack of DP Standards Seen Choking Retailers

By Bill Laberis
CW Staff

HOLLYWOOD, Fla. — Efforts to more fully automate the retail industry have reached the same choke point that plagues other industries — the lack of communications standards.

At the root of the problem is the nature of the retail business itself. It is a hodgepodge of many distinct retailers and suppliers, each

with different hardware configurations and each having its own purchasing, ordering and stockkeeping methods.

Mediating between the two are the third-party computer service companies, in whose best interest it is to make some sense out of the plethora of communications standards in order to bring buyers and sellers together in an orderly fashion.

"That's the challenge fac-

ing your industry today and one of the biggest stumbling blocks you will face in trying to increase productivity through automation," according to David C. Paoli, sales manager for General Electric Information Services Co. He made his observations at the National Retail Merchants Association's 23rd Annual DP Conference here recently.

Paoli, who halfheartedly

characterized the Ansi X.12 communications protocol as the "standard to end all standards," claimed the retailers' DP managers have failed to show corporate management the economies realized from fully automating and standardizing retailer/vendor ordering procedures. This, he said, has continued at the same snail's pace of communications standards development in retailing.

He pointed out a few cases that lend themselves well to standards development. For example, a very large vendor, or a very large retailer for that matter, can exercise enough market clout to dictate a desired communications standard, one compatible with his host equipment and order protocols. But the real world holds few such ideal cases, especially in retailing, Paoli added. And the problems created by hardware incompatibility really go beyond the retail industry and into the computer industry, where retailers have little or no control.

"Obviously, when you have vendors who sell to multiple retailers and must adopt multiple standards, or when the retailer lacks a sophisticated systems configuration, unable to drive automatic order purchasing, you have problems and headaches — big headaches," Paoli said. Tooting his own horn and that of the computer service business at large, Paoli said the logical answer to the retail industry's standards dilemma is the third-party intermediary.

Here retailers should follow a structured path to planning, justifying and finally selecting a computer service company to interface between themselves and the vendors. The path starts with a logical cost and benefit analysis, executed preferably by the DP manager with the blessing of corporate management.

Service Bureau Standards

Paoli outlined what the development team should expect from a potential service bureau. The team should ensure that the bureau:

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- Is able to act as a mailbox and a buffer for the retailer's mainframe.
- Has a networking capability compatible with a variety of hardware configurations and communications disciplines.
- Is able to provide various status reports and to be a vocal advocate of industrywide standards, Paoli maintained.

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Retailers Trade War Stories at Annual Meet

By Bill Laberis

CW Staff

HOLLYWOOD, Fla. — Productivity is the name of the game in automating a large retail organization, but the war stories told at the 23rd annual DP conference of the National Retail Merchants Association here recently prove there is more than one way to skin a cat.

The tactics, methods and means of harnessing the biggest productivity gains from information systems vary with the size of the operation, corporate and DP management style and philosophy and DP budget constraints, workshop speakers concluded.

Out of its sprawling information systems headquarters in Chicago,

Sears Roebuck and Co. maintains a highly centralized operation and carefully planned training program designed to motivate a 600-plus member staff serving the company's regional marketing areas.

The sheer size of the retailing giant enabled the DP shops to be equipped with state-of-the-art hardware, none of which would be very valuable without a productive and motivated staff operating it, according to Judith Rusch, manager of headquarters systems at Sears.

And the sheer size of Sears' DP shop demands tight control standards, developed in-house and then drilled into DPs as part of the company credo. Without the standards, the operation and progress of the

company's 28 mainframes and more than 1,000 personal computers — all linked over communications lines — would be difficult, if not impossible, to track, Rusch indicated.

To begin with, all DP personnel go through the company's 3½ month entry-level training course, regardless of whether the employees have had previous DP training. Rusch said the company began its own campus recruiting program 16 years ago, but also scrutinizes its own non-DP departments for fresh recruits to be fully company trained.

The advantages of the extensive in-house training are that it is considerably less costly than outside training, it ensures the company has a technically current staff and it permits

Sears to give employees a tailored courseware geared specifically to Sears' needs, Rusch said.

But perhaps the most important benefit of the training is in the way it teaches all DPs the same company-developed standards of DP protocol, she said.

Sears also provides each DPer with his own office and terminal and provides for the periodic and frequent sharing of information and ideas at regularly conducted "communication forums" hosted by the various department managers.

Without citing specific figures, Rusch said the success of Sears' productivity techniques can be measured in terms of the DP shops' less-than-average rate of turnover as well as by an absence of frequent information bottlenecks that snag the movement of merchandise or impede financial recordkeeping.

At the 509-store Gap chain headquartered in San Bruno, Calif., Edward Strobin, senior vice-president of information services, said he has "bent over backwards to create an information system that is truly user-friendly and user-helpful."

Strobin, whose shop's primary users include the Gap's district managers and financial executives, said users are "largely tired of waiting and can't get what they want out of most shops, no matter what kind of expensive hardware there is.

"At the Gap, what we said to the users is, 'if we can't meet your needs, you can do it yourselves,' and we offered planning codes," Strobin said.

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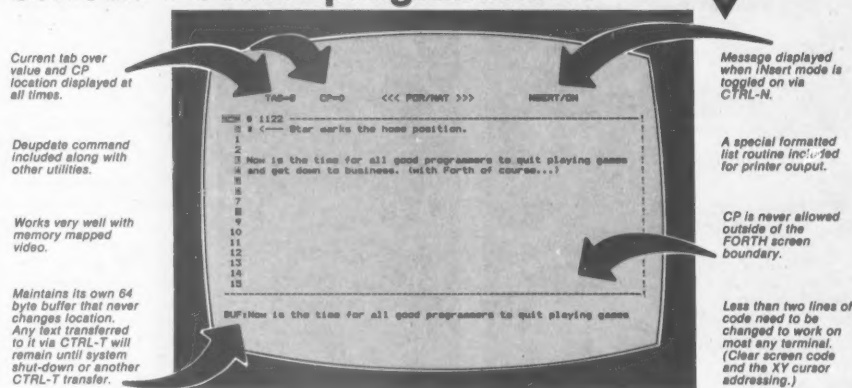
The planning codes allow the users to have direct access to disk space through which they can format their own simple programs for small jobs. The company also bought several microcomputers for executive use. This feature of the shop structure has freed up Strobin's other 30 DPs for the bigger jobs, he said.

Strobin also implemented a detailed systems planning procedure designed to ensure any new system will have been thoroughly reviewed before it is actually installed. This procedure mandates that all project managers and department managers caucus and review the system's external design and then publish the design for all users to see and examine before the system is tested. Again before system installation, the design is cleared with the operations analysts "because they are the grunts who have to service the system once it's up and running," Strobin said.

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List of commands: These commands are for the TeleVideo 912, but are very easily modified to match the character set or special functions keys on any terminal.

- DEL Delete — Delete character to left and move CP left one position.
- CTRL-L Right arrow — CP advances one position to right.
- CTRL-H Left arrow — CP advances one position to left.
- CTRL-G Get character — Character at CP location is erased when all text on line to right is moved left one position. The end of line character location is blanked out.
- CTRL-I Tab over to next tab location — The tab over count is stored as a variable and can be changed to any number between 0 and 63. CP will advance to next location each time command is given.
- CTRL-J Down arrow — CP moves down one line and maintains same column position.
- CTRL-K Up arrow — CP moves up one line and maintains same column position.
- CTRL-E Erase line — Line occupied by CP will be completely erased.
- CTRL-S Spread open — All lines below and including CP line move down one line. Last line is lost.
- CTRL-T Transfer — Transfer the CP line to the editor buffer. The editor buffer contents will be overwritten.
- CTRL-R Read — Read a copy of the editor buffer into the line occupied by CP. Editor buffer contents remain unchanged.
- CTRL-O Delete and close — All lines below CP move up one line and last line is erased to all spaces. Original line is overwritten.
- CTRL-C Clear — All lines below and including line occupied by CP are erased to all spaces. Total screen is erased if CP is on first line.
- CTRL-B Beginning of line — CP moves to leftmost position on line.
- HOME Home — CP moves to top leftmost position of FORTH screen.
- RETURN Return key — Do a carriage return line feed.
- CTRL-Z Zap to end of line — All text from CP to end of line is erased.
- CTRL-F Find — Search screen starting at CP position for a string that matches the contents of the editor buffer. (This routine is purchased separately.)
- CTRL-N Insert mode is toggled on or off — Character input at CP location will push text on current line to right one position. Last character on line will be lost. delete, valid character entry, control-G and control-I are the only commands recognized while in insert mode. control-G works the same. delete not only deletes the character to the left, but also moves text from CP to end of line left one position. control-I will toggle insert mode off.
- CTRL-Q Quit editing and return to FORTH.

Three listings included. The first listing is for use with a standard CRT terminal. The second and third listings are for use with a Memory Mapped Video (16x64 and 24x80).

The above example reflects a transfer of line 3 to the editor buffer via control-T. The editor buffer contents can be read into any line occupied by Character-Pointer via control-R. This buffer never changes location and its contents are displayed at all times. It is very handy for relocating lines or moving lines from one screen to another.

Please note the "INSERT/ON" message displayed at the upper right to indicate that the insert mode has been toggled on via CTRL-N. This message is erased when insert mode is toggled off.

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Cites 'Impregnable AT&T Monopoly'

Lobbyist Blasts Senate Version of S. 898

By Bill Laberis
CW Staff

HOLLYWOOD, Fla. — The recently passed Senate telecommunications deregulation bill will give rise to "a newly legitimized and virtually impregnable AT&T monopoly," according to a Washington, D.C., lobbyist representing some of the country's biggest telecommunications users.

"Moreover, most members of Congress don't have the vaguest notion what telecommunications is and they don't want to discuss it," said Tracy Mullin, speaking at the National Retail Merchants' Association (NRMA) 23rd Annual DP Communications Conference here recently.

"You go to talk with them [congressmen] about telecommunications legislation and they end up talking Awacs [Airborne Warning and Control]," explained Mullin, NRMA's vice-president and associate director of government affairs and the association's prime voice on telecommunications legislation on Capitol Hill.

Enthusiastic Applause

Her lambasting of the Senate version of the bill allowing AT&T to compete in unregulated markets drew enthusiastic applause from conference attendees.

Throughout her talk, Mullin referred to the creation of an unregulated AT&T telecommunications subsidiary as "a classic example of the 800-pound gorilla joke" (Where does an 800-pound gorilla sit? Anywhere it wants).

Mullin maintained most congressmen are caught up in the rush to rid the economy of costly regulations, so much so they cannot see telecommunications deregulation "for the unique case it is." The technical nature of the bill is far beyond the grasp of the lawmakers, she explained.

"In fact, there are only two people in the world who fully understand the bill's implication and they disagree," she joked.

She said the overwhelmingly approved (90 to 4) Senate bill (S. 898) in no way ensures that competition in the telecommunications industry will flourish, "rather, just the opposite." The bill, she said, will actually tend to discourage other companies

from jumping into the telecommunications equipment and services market.

For the retailers, who last year spent more than \$2 billion on telecommunications, the creation of an unregulated Baby Bell would foster uncertainty and make prudent planning a nightmare, according to Mullin.

Multibillion-dollar NRMA members like Sears Roebuck and Co. and J.C. Penney Co. currently possess some of the most sophisticated and largest telecommunications systems, through which more than a million transactions per day are processed in 50-state networks.

To protect the retailers' vested interests in the telecommunications arena, Mullin and other lobbyists set out last summer to create their own 800-pound gorilla, a countervailing force against the deregulation juggernaut.

Tele-Cause Group

Mullin helped organize a coalition of users, providers and manufacturers of telecommunications equipment and services, exclusive of AT&T. The organization, Telecommunications Competitive Alternatives for Users' Services and Equipment (Tele-Cause) claimed to represent 5,000 user companies that

spend over \$20 billion annually on telecommunications.

Tele-Cause drafted amendments to the then-proposed Senate bill, some of which the Senate leadership agreed to incorporate into the bill. Mullin, however, made it clear that the final and approved version of S. 898 is far from acceptable, Mullin said.

Mullin explained Tele-Cause will now carry the fight to the House of Representatives, which will take up its own telecommunications deregulation bill later this year. The House, she said, offers a more favorable climate to the drafting of user-oriented legislation.

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Critics Rap International Aspects of S. 898

By Jake Kirchner

CW Washington Bureau
WASHINGTON, D.C. — Criticism of the Senate bill that would replace the Communication Act of 1934 has centered on its domestic deregulation provisions, but the bill was also sharply rapped recently for its international communications and information proposals.

Anne Jones, member of the Federal Communications Commission (FCC), said last week S. 898 would impose on the FCC responsibilities in the international area it is not particularly prepared or willing to assume.

Specifically, Jones told a meeting of the Computer and Business Equipment Manufacturers Association (Cbema) last Tuesday that the bill would give the FCC powers to enforce reciprocity between foreign and domestic providers of both telecommunications and information services.

Reciprocity refers to the process of giving foreign carriers and data service providers authorization to operate in the U.S. dependent on the extent to which the home governments of those organizations give U.S. firms equal treatment in their markets.

Barriers Abroad

Congress has become increasingly disturbed in recent years about the barriers to American companies seeking markets and access to communications facilities abroad.

The fact the U.S. does not impose barriers on an equal scale prompted the legislative proposals to ensure reciprocal international arrangements, she said.

Although the Communications Act, as it now stands, already gives the FCC power to enforce reciprocity, that authority has never been tested in the courts. A section was included in S. 898, therefore, to specifically give the FCC that authority, and a similar proposal has been put forward in a separate House bill.

However, Jones said her

view of the FCC is that "we are experts in communications issues, but not in international trade matters." She questioned the advisability of forcing the commission to develop an expertise in international matters that is already in place at other government agencies such as the State and Commerce Departments.

She also questioned whether it makes sense to place

more regulatory responsibilities on the FCC when it is trying to limit its domestic regulatory activities through its Second Computer Inquiry decision.

She pointed out the definition of information services in S. 898's reciprocity section is "roughly equivalent" to the definition of "enhanced services" that would be deregulated in the Computer II implementation process.

"Thus," she said, "in the international area, S. 898 would appear to involve the commission in areas of the industry from which we are trying to disengage ourselves domestically."

"As a matter of policy, it seems clear to me," Jones said, "that the commission should not be involved in the information service industry, and as a practical matter I do not believe that it

is very efficient for us to be involved in an industry only for international reciprocity purposes and not for purposes of domestic policy."

"The commission is an expert agency, but it does not have expertise in the information services industry per se, and I do not think that it should acquire such an expertise solely to address the reciprocity issue," she explained.

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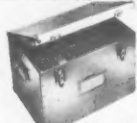
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'Wish Book' Advocated to Limit User Changes

By Jeffrey Beeler

CW West Coast Bureau

CARMEL, Calif. — At first, the system development project went virtually without a hitch. Users of the proposed system defined their requirements and then, with the help of their company's computer department, hammered out the application's functional design.

Before long, the two sides had decided exactly what the

system was supposed to do, how much it would cost to build and when it would finally go into operation.

But then, trouble suddenly struck. Midway through a review session, user representatives began to voice serious misgivings about the system and insisted that it be redesigned to accommodate additional functions.

For computing department representatives, the request

came as a shock. "What's going on?" a systems analyst asked. "You worked closely with us on this system and you knew exactly what it was intended to do when you approved the original design. Now you say you want something different."

"Sorry," the user said. "At the time, we didn't realize what we were agreeing to."

Scenes like the imaginary one above are old hat in a

computing shop. And when nontechnical users unexpectedly change their minds about what they want a proposed system to do, they often merely compound the burden on an already overextended computing department. In many cases, they also force their systems professionals to recalculate budgets and revise schedules.

Little wonder, then, that many information systems

managers advocate some kind of "design barrier" to limit the changes. Rand Corp.'s computing services chief Jerry Koory has devised a technique he calls a "wish book." He described his invention at a recent executive briefing session for members of the Education Consortium, an information systems management group formed by the Danville, Calif.-based consulting firm of Kapur & Associates, Inc.

In essence, a wish book consists of a three-ring binder in which Koory's project leaders note additional features users would like to see incorporated into a system after its functional design has already been approved.

When a user asks for a design change never provided for in original specifications, a project leader immediately records the request. If the user then inquires whether the suggestion will be adopted, the leader replies, "No, not in the system's first version. But we fully intend to keep your request in mind when the time comes to develop a successor to the current system."

Reaction to Koory's wish book proposal was mildly critical. One conference attendee characterized the technique as "inflexible" and indicative of an attitude that "insists on giving users a system whether they want it or not." Another urged that design barriers be viewed as "design sieves" and that they provide enough flexibility to permit systems to be revised even as they are being implemented.

Koory, for his part, admitted to being "biased on the side of the person who's trying to get a system out the door."

In the end, the attendees' attitudes toward design barriers were probably best typified by the conference's organizer, Gopal Kapur. "Barriers don't mean that you can never change a system once its design has been reviewed and accepted," he said. "They simply mean that, if you do make changes, a project will cost more and take longer to complete than the users originally planned."

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Within Four Years Exec Builds Two Data Centers From Scratch

By Bob Johnson

CW New York Bureau

NEW YORK — Building a data center for a company division from the ground up is an impressive career feat. But building two of them could rank as exceptional.

That's exactly what Gregory F. Brown, assistant vice-president of computer operations in Citicorp's traveler's checks division, has done in the last four years at the international bank.

A DP operations man since 1963 who literally climbed the DP ladder, Brown broke

into the world of computers at a time when he said IBM 1401 computers "were hot."

His varied experience spans almost 20 years and includes card reader and punch equipment operation, programming and the introduction of on-line stock transfer, which he referred to as a "brand new idea at that time."

Citicorp Center

Discovering Brown's broad range of experience and qualifications, Citicorp called on him in late 1978 to

build a data center for its traveler's checks operation. The only stipulation was that he do it in six months.

Previous to that time, Citicorp was using a service bureau and had no computer operations for the traveler's check division at all. "I was just about the first man in the door for the operation's area," Brown said, and added that it became his job to determine what hardware and software were needed, who to hire, how to train the staff, test the work and provide services to the development

staff. "I had to draw upon every bit of experience of my career, millions of dollars were at stake here," he said.

Brown answered the challenge and selected IBM 3032 processors, which are now the hub of the traveler's checks operation. This area runs seven days a week, 24 hours a day and includes international communications, according to Brown.

Recently, Citicorp called on Brown again, this time to build a data center for its Buffalo, N.Y., money order facility. He accomplished this work in 90 days, commenting, "It was a real trip. You don't often get a chance to start from ground zero and I got two."

Definite Ideas

In charge of a computer division that processes billions of dollars a year with about 20 key people reporting to him, Brown has some definite ideas about DP management. One in particular is how operations personnel are viewed in the eyes of upper management. In 1971 during a stint at Amex Corp. as an operations shift supervisor, Brown found that operations personnel were not highly regarded in the corporate scheme of things. He said, "I found a gaping hole in the computer field. Operations people were being treated as second-class citizens in the DP community."

Not only did he find problems among operations personnel, but also with the operations environment, which he attributed to the negative feelings of management. "The shop was a zoo. It had no organization," he said. Brown decided that some order was necessary and began to call upon his DP skills. He installed some original and innovative concepts to Amex's operations area, which included job scheduling, forms design, a tape library and what Brown considered most important — the unification of all job aspects under one job number. This order and smooth operation made the data center look professional to management, he stated.

The results of his stay at Amex strengthened his belief that operations areas needed help. "I felt that I knew how to make operations work as a first-class tool and make management realize it," he said. He also put together a manual on how to run an operations shop, which he referred to as a "cookbook."

He predicted that managers will have to become more administrative in light of the fact that DP budgets will become larger. He also predicted that a strong knowledge of communications is essential for the operations manager, alluding to Citicorp's satellite plans for 1982.

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Local Politicos Succeed In Killing Chicago Survey

CHICAGO — A group of local politicians here succeeded in wrapping a micro-computer-based neighborhood needs survey in so much red tape that the effort recently was forced to an end.

Five aldermen had obtained a court order in May to stop the progress of the 13-question survey [CW, June 8]. Their charge was that the survey of more than 200,000 Chicagoans could not be done for \$375,000, which was the price asked by Chuck Green and the Professional Computer Applications group that was conducting it.

Another issue, according to Green, was that the aldermen felt the survey was a political tool for Mayor Jane Byrne and should therefore be paid out of her political funds.

Green said the lower court's decision was held up when one of the aldermen took the matter to the State Supreme Court to request a change in

the judge hearing the case. He added the alderman had some affiliation with the current judge and feared this would later affect the result of the case.

No Grounds

The Supreme Court essentially sent the matter back to the district court, finding that the aldermen "had no grounds to stop the work based on a presupposition of the mayor's use of information for political measures," Green explained. However, the politicians brought the case to an appellate court and, facing additional delays and the slow processing of the matter, Green and his associates withdrew from the contract.

They agreed to give the city the data they had collected to date, based on interviews with about a sixth of the people they had intended to contact. Ninety percent of the development costs were expended, according to Green.

GAO Turns to Business for Federal Role Model

By Jake Kirchner

CW Washington Bureau

WASHINGTON, D.C. — The U.S. General Accounting Office (GAO), a persistent critic of government DP procurement practices, has turned to the private sector for examples of how federal agencies might streamline their procedures.

The GAO studied computer equipment acquisitions at 18 large organizations, including utilities, high-technology firms, banks and manufacturers and concluded that, as expected, their procurements are generally more efficient than those of federal agencies.

"Computer acquisitions at the 18 large organizations we studied are not difficult and are not time-consuming," the GAO said in a just-released report on its investigation. "The acquisitions procedures are understood, followed and consonant with normal business planning and funding practices."

The GAO said it recognized "that the organizations studied have more latitude in their practices than most federal agencies" and carefully refrained from endorsing any particular private sector practice.

However, the GAO said it hoped its "discussion of how these organizations employ strategies and plans interacting with management and controls and user responsibilities and accountability will stimulate positive changes in the federal community."

The GAO reported computer acquisitions at the 18 organizations are normally completed in under a year. Small, peripheral equipment acquisitions take about two months; large, simple acquisitions, such as CPU upgrades, take about five months; and large complex buys, including "major software development efforts," take about 22 months, GAO said.

This allows the organizations "to plan for and obtain current computer technology," GAO said. This contrasts with federal procurements, which are often criticized as being so lengthy that they result in acquisition of obsolete equipment.

Also, the GAO said, nonfederal organizations "can respond quickly to user demands for new or increased data processing capability."

The report attributed the short acquisition time frame to several factors:

- Overall strategies and plans, which provide direction for computer equipment acquisition and usage.

- Policies and practices, which make the information user responsible for defining and paying for information systems requirements.

- Management that controls computer acquisitions through formal, technical and funding approval processes that involve early informal communication, technical assistance and guidance.

- Procurement practices of a central procurement office.

The GAO was particularly impressed with the practice of making the end users responsible for their own information requirements evaluations. "This involves a determination," the study said, "of current requirements, a forecast of future needs and a periodic revalidation of

the existing work load. In addition, users are held accountable through the budget process for the beneficial and cost-effective use of the computer and they must pay for the support through a charge-back system."

The report also noted the strong control exercised by management over computer equipment acquisition in the nonfederal organizations.

Federal agencies are bound by a complex and detailed set of procurement regulations, which emphasize maximum competition and which can slow acquisition, testing and acceptance of computer equipment. The GAO noted private sector organizations have considerably more freedom. For example, "limited use of both full competition and bench-

marking shortens and simplifies the procurements" of nonfederal buyers.

"Equipment selections are made by a technical staff with some competition among third-party and plug-to-plug-compatible vendors if the incumbent manufacturer is not the preferred selection. Instead of benchmarking, reliance is placed on published information and the experience of others," the GAO found.

As to what lessons federal managers might learn from their nonfederal counterparts, the GAO said "We believe [their] management control, planning, accountability and specific procurement practices ... work together as an integrated whole to reduce the total acquisition time and complexity."

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Exec: DP Managers Neglect People Resource

By Jeffrey Beeler

CW West Coast Bureau
SAN FRANCISCO — Computing department managers devote so much of their attention to acquiring the latest technology that they often neglect the needs of the most important systems resource of all — their people, an ITT World Communications, Inc. executive said.

"We as an industry spend much more of our time eval-

uating new hardware than trying to do an effective job of recruiting or creating interesting job descriptions," Thomas Lutz said recently at an Association for Systems Management meeting. "The reason we act this way is that hardware and programs are all most DP managers understand. They're scared to death of dealing with issues involving people."

Lutz, who serves as educa-

tion director for ITT's software technology center, urged computing shop managers to consider more than just hardware and software in their efforts to boost information systems productivity. Equal attention should also be given to a system's other major components, some of which include its information, users, application packages and programmers.

"To improve a DP depart-

ment's productivity significantly, you have to address the shortcomings of your entire system," not just one or two of its constituent elements, Lutz told his audience.

Computing shop productivity would have to skyrocket 300% to 500% before current user demand for new applications could be fully satisfied. Only about 15% to 20% of the necessary increase can

reasonably be expected to come from enhancements in technology.

Much of the remaining productivity improvement, therefore, will have to be supplied by significant advances in managing personnel. "Effective, capable, contented people can contribute much more to increased productivity than the mere installation of new technology," Lutz said. "In fact, a well managed staff can boost productivity by as much as 200% to 300%."

Management Key

One of the keys to effective personnel management is to make sure employees have ample and continuing opportunities for training and professional self-development. "People in this industry periodically have to update themselves technologically," the ITT executive said. "If they don't, they run the risk of becoming professionally obsolete in 18 to 24 months."

Another basic strategy in effective personnel management is to ensure that systems remain subservient to the people who develop and use them. "Information systems are a wonderful tool for getting things done, but all too often they crowd people right out of the picture," Lutz said. "In many cases the tools have become the master of the people rather than the other way around."

Course to Show How to Modify Warnier/Orr

SANTA ANA, Calif. — A five-day workshop course on modification techniques for existing programs using the Warnier/Orr design methodology will be held in four cities by Videodisc Learning Systems, Inc.

These techniques reportedly give the technician the structured tools to analyze and modify existing programs in Cobol, Fortran and other languages.

The seminar will be conducted in Chicago, Nov. 2-6; New York, Nov. 16-20; Los Angeles, Dec. 7-11; and Washington, D.C., Jan. 18-22. It will include a discussion of how to develop a logical program design using diagramming tools, evaluating test plans and how to distinguish between "good and bad" programs, according to the company.

Registration costs \$795 and further information can be obtained by contacting Videodisc Learning Systems at 10522 Ridgeway Drive, Santa Ana, Calif. 92705.

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User Involvement to Grow 'Information Centers' Seen Commonplace

By Jeffrey Beeler

CW West Coast Bureau

SAN FRANCISCO — Huge applications backlogs and mounting maintenance requirements are bringing about a profound reformation in information systems service strategies.

As demand for scarce computing resources has steadily grown, corporate DP departments have increasingly had to jettison some of their system development work load and allow nontechnical end users to assume increased responsibility for meeting their own application needs.

Nowhere has this growing emphasis on user self-service found more vigorous expression than in the advent of the so-called "information center" concept. Though hardly a new idea, information centers have only recently begun to gain widespread acceptance. Within the next few years, they are expected to become an industry commonplace, according to Richard Macy, a "consulting marketing representative" with IBM's nearby Oakland, Calif., office.

"It's no longer a question of if companies will start using information centers," Macy said during a recent Association for Systems Management meeting here. "Now, it's only a matter of when the concept will finally be adopted."

Tools, Techniques

The main intent behind the information center phenomenon is to provide nontechnical end users with the necessary tools and techniques to develop some of their own systems without computing department assistance and to retrieve management information on their own terms.

A similar service philosophy is already well-entrenched in the banking industry, where customers are increasingly using automated cash dispensing machines to do routine financial transactions that have formerly been done by tellers.

By allowing system development projects to be off-loaded from computing departments to their end users, information centers can ease the burden on overworked programmers and analysts and enable them to turn their attention to other assignments, Macy said. The centers can thus speed the development of new applications and increase computing department responsiveness to user requirements.

To illustrate an information center's potential advantages, Macy cited the recent case history of a Canadian company, whose identity he did not reveal. After experimenting with the information center concept for five years, the firm reported these results:

- Program maintenance shrank from 70% to 40% of the company's computing department work load.
- User-developed applications accounted for half of the corporation's total systems output.
- A staff of only nine computing professionals found itself able to satisfy the needs of some 500 end users.
- Each \$1 in information center cost yielded \$2 in benefits.

"I would strongly recommend that information centers be adopted,"

Macy said. "They're certainly far from being a panacea for all of a DP shop's problems, but they do provide those installations with a kind of necessary safety valve."

One of the most serious and common pitfalls that an information center can help to eliminate is the unchecked proliferation of incompatible programs. Until fairly recently, most nontechnical end users left the task of developing new applications almost entirely to their full-time computing staffs.

But as demand for automated systems rapidly grew, so did the response time between a typical user's request for services and the delivery

of a finished product. To remedy the problem of ever-expanding lead times, users have increasingly begun to bypass their in-house computing departments and create their own systems on dedicated minis and micros. The drawback with this alternative approach to project development is that the resulting programs are usually written on different vendors' processors and thus are incompatible both with each other and with any host system in which they might later be incorporated.

Information centers, however, could greatly alleviate the incompatibility problem by enabling corporate computing departments to set

and enforce strict, companywide standards to which all user-controlled minis and micros would have to conform. On the other hand, the centers would also ensure users a much higher degree of systems autonomy than if they remained entirely dependent on their corporate processing shops.

But whether information centers realize their full potential will depend ultimately on how effectively end users and their do-it-yourself software are supported. The main objective in establishing an information center is to produce systems that are as easy as a telephone or calculator for an unskilled operator to use.

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To Whom Should a Director Report?

Q Our yearly DP budget is 2% of sales and comprises a substantial portion of administrative costs. Since so much has been written about the importance of organizational neutrality, I have initiated an evaluation of organizational alternatives.

I feel that our present level within the organization limits our capability to be responsive. Three years ago, I reported to the comptroller. I am still the director of DP, but now I report to an assistant comptroller. Would you endorse a suggestion that I report to the president?

A The only definitive statement that I can make about your particular circumstance

is that no head of a corporation information services (DP) function should ever report to an assistant controller.

The director of a well-organized and properly chartered centralized information services organization should be at a high level, perhaps a vice-president. The optimum level is based on scope of services, the manner and degree to which information services affects events and activities in other functional areas, and, to a lesser extent, the capabilities and potential of the DP personnel.

Budget share is seldom a good indicator of corporate significance.

Q Some years ago I made a mistake by leaving the data processing field to work in

tool and die. I have returned now and have worked in various DP shops, most of them less than state of the art. I have tried to improve myself by seeking an M.S. in computer science.

I have been unemployed for two months and am working with several DP search firms and pursuing employment on my own. I lean toward technical direction. I know Cobol inside and out and am proficient in Bal. I also have tried to get into systems programming.

Unfortunately, I do not have extensive CICS or data base experience and the number of jobs I have held in the last few years has given me the appearance of being unstable. The only places willing to talk

Turnaround Time

By Larry E. Long

to me are all the same and I want to improve my situation.

I am always able to use my experience in helping junior programmers, but I cannot seem to help myself. Am I already outmoded?

A The grass is not always greener on the other side of the hill. There comes a time when you must establish yourself and prove to yourself and to your employer the potential of your contribution.

Contrary to popular belief, most computer centers are not state of the art. Base the selection of your next employer on whether you like the people and what you perceive to be in management information systems (MIS). Be innovative and improve your skills by guiding your employer to new levels of sophistication.

After a reasonable period of time, you may wish to market your skills elsewhere, or you might enjoy the environment that you helped to build. After all, there is no law requiring MIS professionals to seek employment every 2.2 years.

Q I appreciated your publishing my inquiry several months ago when I asked whether there were any ordinary presumptions against me in my search for new employment, given that (a) I had been back in programming only a short time, and (b) I had several years of experience, but was being paid as if I had no more than one year of experience.

You stated that there were no presumptions against me. Yet one prospective employer said he suspected I was leaving because I could not do the work. He asked one of my references why I did not devote my effort to succeeding in my present position.

A Such comments or implications by an interviewer should be dismissed as ignorance on his part and are usually not representative of the company. Any company allowing such persons access to potential employees is making a serious mistake. In a tight market, a company should play their first team in every aspect of the recruiting function. Every person on the candidate's itinerary should be there for a reason. These reasons were discussed in a March 24 "Turnaround Time" column. Companies experiencing recruiting woes may benefit from a review of this column.

Long is a professor at Lehigh University, a DP consultant and author. If you have a question you'd like him to address, send it to Larry Long, Editorial Department, Computerworld, P.O. Box 880, Framingham, Mass. 01701.

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Survey: Pharmacists Unhappy With Computers

BLUE BELL, Pa. — More and more pharmacists are using computer systems in their businesses, but only about half of them are moderately satisfied with their computers' performance.

In fact, most of those complaining about system inadequacies point out that the computers are not flexible enough, they lack some key features and the machine's vendors are not responsive to their needs, according to a survey recently completed by Computertalk Associates and published in its monthly newsletter, which is geared for first-time computer users.

The survey involved about 300 pharmacies across the country currently using computers in their day-to-day operations. About 70% of the respondents are using stand-alone or in-house systems, while 30% opted for a time-sharing arrangement, the survey stated. The majority of both stand-alone and time-sharing users had less than three years experience with computer-based pharmacy systems.

In the survey, 47% of the stand-alone and 62% of the time-sharing users reported they were moderately satisfied with their systems' performance, while 22% of the users from

both sides said they were not satisfied at all with their computers.

Not Flexible

When asked to detail their dissatisfaction, 18% of the total users reported that the computers were not flexible enough and many features were missing; 9% said that maintenance was unreliable; 5% claimed the system was too small; and 6% said they could not upgrade the systems' hardware. Other complaints included nonupgradable software, too much downtime, too many system bugs and too much expense.

On average, more time-sharing us-

ers claimed dissatisfaction with their present computing arrangements than did pharmacies with stand-alone systems. The survey revealed that stand-alone systems appear to be gaining in popularity at the expense of their time-sharing counterparts. Finally, so as not to slight those pharmacies that may be installing computers in the near future, the survey asked pharmacists not presently using computers what type they would eventually select. When the responses were tallied, 86% of the noncomputerized pharmacies indicated that when the time came they would select stand-alone computers.



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Blackouts Bring Down N.Y.C. Systems Twice In Less Than One Month

By Bob Johnson

CW New York Bureau

NEW YORK — New York City computer systems were recently knocked out of service for the second time in less than a month because of electrical power failures.

Although coming on the heels of a major blackout that hit the Wall Street area last month [CW, Sept. 14] and disrupted computer systems of many large companies, this outage did not appear to affect local business.

Lasting for less than a second, according to Consolidated Edison officials, the power dip did cause the police and fire departments' emergency systems to experience some problems.

Paper Back Up

Reportedly caused by a short circuited feeder line, the mini blackout forced the police department to resort to a manual paper system to back up its inoperable special police response inquiry network (Sprint).

The Sprint system, powered by an IBM 360/148 CPU, was out for almost an hour, the police department said, but noted that there was no noticeable disruption of service. A spokesman for the department's communications divi-

sion said that 911 requests were written up by hand and given to a police dispatcher who then forwarded them on to the proper radio car.

At the same time the fire department's \$15 million computer-assisted dispatching system, Starfire, which is hooked up to the city's 16,000 fire alarm boxes through a Digital Equipment Corp. PDP-11/70, also went down for close to an hour. The fire department was also forced into using a manual system to dispatch fire companies throughout the city, a spokesman said.

The reason the Starfire system was down for such a long period of time was because it has no uninterruptible power supply, according to Aaron Kupfer, project manager of Starfire.

However, he noted that the fire department is currently in the process of getting an uninterruptible power supply. "We could have recovered within 10 minutes, but we had to try and retrieve historical data that is important to the Starfire system," Kupfer said.

"We were successful in retrieving data in a situation as we had. We had to restore from fixed to movable head disks and this is what took the time."

International Transactions Settled Same Day by Chips

By Bob Johnson

CW New York Bureau

NEW YORK — Same-day settlement of international banking transactions is now possible, thanks to a change in the New York Clearing House Association's Clearinghouse Interbank Payments System (Chips).

The 11-year-old Chips system began this month to permit settlement of international electronic transactions on the day they occur instead of on the following day as was previously done.

Chips is the electronic medium New York banks use in place of drawing official checks to exchange funds domestically and internationally. The new Chips is expected to cut foreign settlement time from 16 hours to about an hour and a half, according to John F. Lee, executive vice-president of the clearing house.

Established in April 1970, the system does now essentially what it did then, except that it now allows for same-day settlement. Powered by a Burroughs Corp. Model 6700, the Chips system is hooked up via telephone lines to 100 New York banks. Chips reportedly moves an average of \$200 billion a day between New York banks and out-of-state and foreign banks. It also clears 80% of all bank payments made in U.S. dollars around the world.

"Prior to Oct. 1, transactions were closed and settled in the evening of day one and banks were told their net figures and then settled the next morning, day two. With the new Chips method, settlement occurs in the afternoon of day one and transactions are settled that evening," Lee said.

'Conceptual' Change

The changes to the Chips system were more educational than mechanical, according to Lee. Software changes were minimal, including only some routines and security measures and the bulk of the hardware remained the same.

"It was a conceptual change," Lee said. "We had to convince customers to change their settlement procedures and to constrict the time frame of their computer systems." Each participating bank's system had to be reliable and have backup systems because of the delicate nature of the transaction process, he added.

Each of the 100 banks involved has a terminal hooked up to Chips asynchronously in New York and about 25 of them are connected bysynchronously, computer-to-computer, Lee noted. "More banks will be connecting bysynchronously in the future because of heavy volume."

The chief reason for the change in the Chips system stems from the New York financial community's concern about reducing risks of defaults on international payments that can occur during the overnight gap between settlement. New York was the only place in the world that had next day settlement.

With the new Chips system, New York banks will now have usable foreign funds available the same day. "This will eliminate much, if not all of the risk in the system," Lee said.

At Irving Trust Co., a major New York bank that is part of Chips, a spokesman gave the following brief scenario of the system's operation: When Irving receives instructions from foreign banks to make payments for their accounts to other banks, terminal operators enter the data, which is then stored until 7 a.m. when input to the Chips CPU begins. At 5:30 p.m. the same day, Chips sorts the information it has received and informs each participating bank how much it owes the system or how much it will receive. This amounts to 30,000 international payments worth \$50 billion, processed each day at Irving.

Lee said that the clearing house is in the process of preparing a new computer center for Chips that will incorporate a new site. He said that because of a growing list of new world-class bank clients who are applying to be part of Chips, it is essential that a new data center be built. More than 50 such banks have applied but cannot be part of Chips until the new system is operational, Lee said.

The system will have a Burroughs B7800 and should be ready sometime in the second quarter of 1982. "The system architecture will not be radically changed," Lee said, adding that the current Chips site will be used as a backup for the new system.

Calendar

Nov. 10-13, Washington, D.C. — **Vsam File Structures with Idcams.** Contact: Boeing Computer Services Co., 7980 Gallows Court, Vienna, Va. 22180.

Nov. 12-13, Seattle — **Software Project Management.** Contact: Digital Equipment Corp., Educational Services, Seminar Programs, 12 Crosby Drive, BU/E58, Bedford, Mass. 01730.

Nov. 12-13, San Francisco — **Con- testing Computer Disputes.** Contact: Law & Business, Inc., 757 Third Ave., New York, N.Y. 10017.

Nov. 12-13, Wellesley, Mass. — **Effective Presentations.** Contact: Priscilla Goudreaux, Q.E.D. Information Sciences, Inc., Q.E.D. Plaza, P.O. Box 181, Wellesley, Mass. 02181.

Nov. 12-13, Detroit — **User Documentation.** Contact: The American Institute for Professional Education, Carnegie Building, 100 Kings Road, Madison, N.J. 07940.

Nov. 12-14, Reno, Nev. — **Accounting and Information Systems Expo '81.** Contact: LeAnne Stone, Division of Continuing Education, College Inn, 334 University of Nevada, Reno, Nev. 89557.

Nov. 13, Columbus, Ohio — **The Impact of New Technologies on Information Service Environment.** Contact: Katherine Frohnmberg, Oberlin College Library, Oberlin, Ohio 44074.

Nov. 14, Boston — **Microcomputer Graphics Workshop.** Contact: Jean L. Graef, Cambridge Development Laboratory and Laboratory Computer Systems, 36 Pleasant St., Watertown, Mass. 02172.

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State Dept. Drawing Up Communications Goals

By Jake Kirchner

CW Washington Bureau
WASHINGTON, D.C. — The U.S. State Department, under increasing pressure from Congress and U.S. multinational corporations to take a more aggressive stance on international high-technology issues, is developing a comprehensive set of policy objectives on international aspects of communications and information.

In a 47-page policy discussion paper now making the rounds of federal agencies for comment, the department noted that "rapid development of communications and information technologies and services is restructuring the basis of international relationships."

The paper, accordingly, attempts to identify "major" U.S. objectives and explores each to "clarify the perspective from which they are viewed and to lay the basis for governmental action in the foreign policy arena."

Seven Objectives

Noting from the outset that "the broad objectives of the U.S. respecting international communications and information reflect a diversity of interacting domestic and international interests," the draft statement discusses at length seven objectives and possible courses of action on them:

- To promote acceptance of the principle of the free international flow of information and ideas, including the principles' applicability to newly emerging communications and information technologies.

State noted this principle reflects First Amendment values and said the principle can foster, through new technology, growth of more open societies throughout the world.

However, the paper recognized that "other nations are wary of the implications of both existing and emerging" technologies. Resulting international regulations "have created serious political tensions, which can be eased only through broader recognition of the benefit of the 'free flow' principle ... This means limiting, not expanding, intervention by governments."

Discussing ways to spread this principle, State said "the U.S. will actively seek the co-operation of like-minded countries in this endeavor."

- To ensure equitable access to the radio frequency spectrum and orbital positions. The U.S. must make a greater effort to keep this issue from being politicized and must be better prepared to defend its interests in relevant inter-

national discussions, the paper said.

- To ensure the flexibility and continuity of communications and information required for the maintenance of national as well as international peace and security.

Communications and information are "crucial" to preserving national security, especially to the maintenance of strong military capabilities, and are equally vital for

"international peace and security," the paper said.

- To expand the economic benefits of communications and information technologies by broadening opportunities for competition and investment. State also said "the U. S. should be prepared to take such action as may be necessary to forestall or discourage discriminatory actions by others."

- To help developing na-

tions build their own communications and information capabilities. There is a great deal of work needed in this area, the paper said, adding that the U.S. "has in fact done a great deal more in the past than is generally recognized."

- To stimulate continuing advances in communications and information technology. Increased use of these sophisticated technologies is in

the interest of all nations.

- To improve the basis for developing and implementing policy. State called for an improved consultation process on these issues involving Congress, executive agencies, private-sector organizations and expanded talks with other countries "to identify and explore at an early stage potential opportunities and problems of mutual interest."

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EDITORIAL

A Look Back at Info 81

What draws thousands of attendees to the Info show every year like lemmings that cast themselves into the ocean? No one can tell for sure.

As with previous Info shows, this year's event offered few new products on the exhibit floor and an assortment of sessions that offered little new information.

In all, 31,500 people came to the New York Coliseum to learn the latest in information management and office automation techniques — as well as to view the most current product offerings. However, most attendees came away with the feeling that the show did not live up to its well publicized promise.

Info is gradually becoming more oriented to the office automation segment of the industry and less to the information management sector. In the meantime, however, it offers a nebulous compendium of both.

Unlike the National Computer Conference, which returns its profits to computer societies, Info is a strictly profit-making show and, as such, should offer more value for the dollar.

Perhaps Info's large crowds are due to the fact it is based in New York City every year and therefore can draw from a large ready-made base of computer employees. Most of the attendees at the conference appeared to be from the New York or Northeast region of the country, so the locale may be one reason for its continued success.

As computer shows proliferate and also become more specialized, they appear to be becoming more regionalized as well. An MIS manager has a variety of shows to choose from on a variety of subjects and frequently in a variety of locations. Rapidly escalating air fares, strict time demands and the cost justification of traveling cross country to a conference that is also — or one like it — being held in the next state are all working to create increased regionalism in the conference circuit.

Not just the attendees are finding this to be true. With the expense of moving equipment, renting exhibit floor space and staffing booths, most computer vendors have for years utilized their regional sales staff at most of the conferences.

Will increasing regionalism harm the quality of computer conferences? Not necessarily. There is as much computer activity occurring within separate industries and organizations as there is within different parts of the country. Diversity of people may decrease, but the diversity of experimentation in office automation, data base technology and other key technologies presented at conferences need not suffer.

It is, of course, the responsibility of the conference sponsors to ensure that they present only the highest quality of information available to those paying their money and taking their time to attend.

DATA PAST

Five Years Ago July 26, 1976

NEW YORK — Seven members of IBM's top executive suite — including Board Chairman Frank T. Cary — appeared at the U.S. vs. IBM antitrust trial in response to Justice Department subpoenas.

The seven appeared as ordered, one from as far away as Paris, to respond to the "last resort orders" backed by Judge David N. Edelstein.

The subpoenas were requested by lead government counsel Raymond Carlson.

Ten Years Ago July 21, 1971

MIDDLETOWN, Pa. — Registration for the Oct. 25 meeting of the RCA Computer Users Association ran far ahead of registration for previous meetings, according to Association President David L. Rau.

The meeting was expected to be based on a statement by RCA officials of their plans for support of computer users.

Rau predicted more than 300 users would attend the San Francisco meeting.



Who Makes Sammy Run?

LETTERS

Sensitive Quote

In the article "EDS, CSC Lock Horns Over Army Contract" [CW, Sept. 21], I was quoted as having said, "Cost is a very, very sensitive area, although it could run over the \$1 billion figure over the 10-year life of the contract." Another quote attributed to me said: "I also can't say whether we'll see more centralization of DP functions or more distributed processing. That is entirely up to the vendor."

This quote is totally inaccurate. In fact, when the figure was suggested, I told the interviewer that cost was an extremely sensitive matter upon which I could not comment.

Because the acquisition is still in the negotiation stage, the Vertical Installation Base Line Equipment (Viable) Project Management Office is very carefully protecting the confidentiality of vendor costs and technical proposals.

Even among the Viable project staff, proposal information is released to only those individuals who require it to fulfill their duties. Thus, although I am a deputy project manager, I have not reviewed the cost proposal of either vendor.

While seemingly innocuous, this misquotation erodes the Army's efforts to assure vendors that confidential information is being protected. Since my statement was quite clear, I cannot understand why the misquotation appeared in the article. However, I am certain that it fails to meet the standards of responsibility and accuracy generally demonstrated by *Computerworld*.

William J. Watts
Lt. Colonel, SC
Deputy Project Manager (Fielding)
U.S. Army
Computer Systems Command
Department of the Army
Ft. Belvoir, Va.

Free Data

I wish to commend *Computerworld* for reporting to its readers what may be the data processing news story of the decade. I refer to the article "Electric Company Adds Usage Graphs to Bills" [CW, Oct. 12]. I am amazed not by the application, but by the ability of a utility to produce this application for free.

In an era of spiraling energy cost, it is refreshing to find an energy retailer who is able to provide voluminous data to consumers for free. Michael Kinslow is quoted as describing the consumption graph and related data as a no-additional-cost application. I assume from his comment that information system personnel must have donated some few months of their off-time to analysis, design and implementation of this "free" application. Granted, any interested consumer could maintain similar records, but this would involve quite a bit of time to update on an old-fashioned piece of graph paper. I suspect some might do this, except that this data is provided at no cost.

Could this application be expanded to provide other data, such as a breakdown on what the real costs associated with a billing cycle are? Could this also be accomplished for free?

Ronald L. Cooper
Analyst
Utility Support Division
Multiphasic Corp.
Oak Ridge, Tenn.

Computerworld welcomes comments from its readers. Preference will be given to typed, double-spaced letters of 150 words or less. Letters should be addressed to Editor, *Computerworld*, P.O. Box 880, 375 Cochituate Road, Framingham, Mass. 01701.

THE DATA CENTER / John P. Murray

Data Center Problems: You're Not Alone

There are no, or at least very few, unique data center problems. An "isolation factor" seems prevalent in many data centers. Often those employed within the data center feel the problems they face are unique. It is supposed, incorrectly, that other data centers never encounter the problems with which they are forced to deal.

Of course not all data centers experience exactly the same type and severity of problems. Factors such as size of installation, the quality of data center personnel, including data center management, sophistication of the data center clients and the size, quality and technical level of the applications portfolio all help determine the type and degree of problems encountered.

Just because the data center across the street never experienced that problem does not mean it never occurred before.

Basic Concerns Remain

As the data center grows, the basic concerns remain. In addition, new types of problems arise. A data center that has used punched cards for the input of JCL will, as it moves to an on-line installation and as the volume of applications increases, find the use of punched cards a cumbersome input method. The JCL cards get lost; they are mispunched; they get out of sequence and new operators are unable to get the cards back in the proper order.

Sooner or later it will become apparent that the control of the JCL must be on-line. The data center response may be that this is too difficult, too expensive: "We don't have the time to make the conversion." These are simply excuses — excuses based on emotion rather than fact. Part of the emotional response may well be based upon the fear (very real to those in the data center) of change.

Inordinate time and effort are lost by data center personnel attempting to deal with and correct problems which, had they known where to seek help, could have been resolved with minimal delay, disruption and expense.

Management's Responsibility

It is the responsibility of the data center management to see to it that employees are provided opportunities to associate with their peers in other organizations. This will help them gain insight into the commonness of data center problems. In addition, they can find help with specific problems through this interaction.

What are some of these common data center problems? They include items such as reruns caused by improper date information, the use of incorrect input files and out-of-date or incomplete operator instructions. Operator carelessness or improper training and supervision can cause systems to abort or bring down the teleprocessing network.

Other problems include reports that get "lost" on their way to client departments or the processing of programs within a particular system

out of sequence, which may allow the system to go to completion successfully, but will cause problems on the next processing cycle.

As the work load and the processing demands grow within the data center, the visibility of the data center also grows. Movement from batch to on-line processing rapidly re-

Computerworld this week begins a new column, The Data Center, which will address issues and problems of concern to corporate data center managers. The column will appear in these pages once a month.

moves the ability of the data center staff to process a few reruns and move along with no one the wiser.

When the processing network is unavailable, every data center client, and in most cases their management, is immediately aware of the problem. The problems may be basically the same as those in batch processing, but now they become more serious.

Anyone who has spent time in more than one data center knows that the problems mentioned here (by no means a complete list) are not unusual. However, there are data center employees who would, upon reading this, be surprised to learn that these specific concerns are faced in data centers other than their own.

The need to break down the isola-

tion factor, to expand data center employees' understanding of the real world, is strong. How can it be accomplished? Something as basic as improved communications between employees of different data centers can be of great help in this effort.

Several approaches can be used to improve communications. Simply

spending a few hours from time to time with employees of other data centers discussing common problems and their possible solutions can be very effective. The organization of local data center operations groups that meet on a regular schedule to share information is a good idea.

Approaching vendors to help support such groups and to provide people to help address problems raised at the meetings will usually produce a positive response.

In those data centers where there are no policies that may restrict it, a plan to exchange employees on a short-term (one- or two-day) basis with other data centers will pay dividends.

Not only will these employees have an opportunity to observe how other data centers operate and solve their problems, they will feel good about the fact that someone is recognizing them as individuals.

'Forgotten People'

Data center employees have historically been the forgotten people of data processing. This situation is something that must change as the work carried on in the data center, through increased use of on-line processing and data bases, brings the power of the computer closer to those who use it. As this occurs, the data center service level must be high and remain high.

Facing and dealing with data center problems in an aggressive, active manner will help resolve this issue.

John P. Murray is director of management information services for Ray-O-Vac Corp., Madison, Wisc. He is responsible for worldwide MIS activities.

Murray has 20 years of DP experience, 10 of which have been devoted to the management of data centers.

Murray is a member of the Data Processing Management Association, having held every office in the Southern Wisconsin chapter, and has been awarded two outstanding performance awards by the chapter. He is currently a member of the city of Madison Data Processing Commission.

HUMAN CONNECTION / Jack Stone

Whom to Hire? Whom to Fire?

It wasn't my plan to make "problem DPers" an issue in the computer trade press, but a number of readers have corresponded with me on the subject. William A. Delaney, president of Analysis and Computer Systems, Inc., sent a particularly interesting letter in which he related some rather compelling experiences with these people. Here's what Bill had to say:

"Your recent article 'Problem DPer Blames Personnel' [CW, Sept. 21] is a classic if I ever read one. The individual concerned even recognizes that he is the problem, yet he blames 'the system' and even freely admits [quoting from your article], 'I would never hire me, but I seem to find work' and 'for the life of me I cannot seem to correct the character defects leading to my having to leave every programming job I ever had.' This is at least an honest person, because most 'problem DPers,' or any problem employees, won't even admit they are the problem, so it is impossible to help them.

"Let me give you some real life examples. They all happened to me.

Delaney: Why did you do that?

Employee: You didn't say I couldn't do that.

Delaney: I don't know how to tell you what not to do. I have never told you not to set the building on fire or not to come to work naked. I can't make a list of all the things not to do.

Employee: I still say it is not my fault, because you never said I could not do it.

Delaney: Why do you always come to work late when you only live two miles from the office?

Employee: I really don't know. Every day something comes up that de-

'I have never told you not to set the building on fire, or not to come to work naked. I can't make a list of all the things not to do.'

lays me.

Delaney: Why don't you get up thirty minutes earlier?

Employee: I don't have to because I live so close to the office.

Delaney: Why are you giving your new manager a rough time?

Employee: Because I wanted his job.

Delaney: But you failed the last two times we put you into a management slot.

Employee: I know that. I am strictly technical and I hate supervising anyone, but managers get higher salaries and better working conditions.

Delaney: You were out sick the day after Christmas and the day after New Year's. What was wrong with you?

Employee: I consider sick leave the

same as paid vacation and holidays, and it is up to me to decide for myself when I am fit or not fit to work.

Delaney: You did not do what you were told to do and you submitted a false progress report. I consider this lying.

Employee: Yes, I lied, but it is your fault I lied because if I had told you the truth — that I did not follow your instructions — you would get angry with me.

Delaney, to a manager: Why did Joe deliver the software late and with no documentation?

Manager: I don't know.

Delaney: You are his manager and are supposed to know. Don't you monitor what your people are doing?

Manager: I can't check into everything and it is not my fault if someone does something of which I am not aware. I can't be everywhere. Also, I have my own work to do.

"You can do little with people like this. I know because I have tried and failed 100% of the time. A willing and reasonable person can learn any job, under normal conditions — these are the 'gems' we cherish.

"Managers should not waste time on chronic problem employees; it's not fair to the 'gems' or to themselves. Managers can't inculcate good judgment in employees. They can try if they must and good luck to them. I wish them better success than I have ever had."

On Army Contracts

"EDS, CSC Lock Horns Over Army Contract" [CW, Sept. 21] was of interest to me for two reasons. First, I have worked in a data processing capacity both for Electronic Data Systems Corp. (EDS) and the intelligence agencies of the government. I am pleased to see an agency, regardless of which governmental agency, use an outside service bureau instead of relying on a vendor for supplying a comprehensive, growth-oriented ap-

proach to data processing.

In most cases, a governmental agency or corporation does not find continuous success in fulfilling data processing and corporate objectives by relying on a vendor. In years gone by, an agency or corporation had no choice but to place themselves in the hands of a vendor due to the unavailability of good service bureaus.

Second, the approach to the task of providing accurate, up-to-date, timely information by developing an organization of human and software interfaces first, and then choosing hardware to adhere to the established people/software system can better be accomplished by a nonhardware vendor.

In most cases, only a well organized service bureau,

like EDS or Computer Sciences Corp., can provide an impartial, cost-effective, flexible and growth-oriented solution. This second factor becomes more important with the people and software cost being much higher than the hardware cost.

Joe D. Giltner
President

Everglades Co.
Chester, S.C.

LETTERS

Urge to Comment

I feel the urge to comment on the troubles plaguing the Social Security Administration's data processing system and staff "SSA's DP Staff Slammed for System Troubles" [CW, Oct. 5]. My 26 years of experience in federal government data processing, I believe, has provided me with some experience and insight into many of the fundamental, common problems that many federal agencies often have.

I would suggest that of the six problem areas identified in one of the articles, all but perhaps the aging hardware could be the result of poor middle and upper management who perhaps do not have the formal education, technical knowledge or management skills necessary to lead, encourage, train and motivate their existing personnel.

I would suggest that a careful review and evaluation of the existing organizational structure and management philosophy of the leaders by Congress would provide insight into solutions to most of the existing problems. More money isn't always the answer!

Dean Ray

Washington, D.C.

What's the Solution?

Ken Schwaber, in "The Case for Output Management Systems" [CW, Oct. 5], employs the reasoning that the chaos spawned by computers can only be subdued by more computers. In the interest of centralized efficiency, he would hand-carry diskettes from a small local word processing station to a central electronic mail room.

This is the moral equivalent of busing school kids 50 miles every day. The only one rubbing his hands gleefully would be the old-type DP manager, who could now stifle those few decentralized computing stations that had hitherto escaped his control.

In the installation envisioned by Schwaber, printed output has obviously run rampant because it is paid for by no one in particular. The discipline to apply here is not that of more machines or more centralized gossplans, but that of the pocketbook. Charge for reports: charge those who needlessly request them, as well as those who needlessly send out unsolicited ones.

Let people decide for themselves what they need on the basis of a shopping list, restricted only by criteria of confidentiality.

But no more piling failed approaches on top of failed approaches, please!

Harry Nagler

New York, N.Y.

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Provides Disservice

In my personal opinion, "The Programmer Shortage Is an Illusion" [CW, Oct. 5] provides a disservice to "green" personnel people.

First of all, unless there is something I missed, I don't see the major difference between my recruiting from my source companies and Rand Information Systems, Inc. (RIS) recruiting in England and/or "depressed regions" of the U.S.

I personally might consider what that practice might do

to aid in the economic recovery of a region if you recruit the single "young" professionals out of the resource base. Additionally, I might wonder what "\$50,000 programmers" will do to reduce the "salary compression" problem impacting all companies in DP.

Furthermore, since a typical fee on a \$30,000 position is \$9,000, I wonder how much

LETTERS

RIS is saving (at the expense of U.S. workers) on the applications side when RIS relocates people who may not conversationally fully appreciate the needs of end users.

In short, I hope that anyone who is people sensitive and has more than a few hours in the people business sees the crying need for the converse of Bortman's methods.

What we need are training

programs, career pathing and policies that reduce salary compression, not exploitive "band-aid" type solutions to long-range problems.

There is one thing Bortman said with which I personally agree — he and RIS don't need headhunters. With his 1950s "ugly American" approach of buying and bringing home Europe's best tal-

ent at market plus prices, who needs a cohesive program, headhunters or anything else?

Philip M. Young
Vice-President

Philip Lawrence
Group, Inc.
Norwalk, Conn.

Headhunter Bias

I read with interest "The Programmer Shortage Is an Illusion."

Unfortunately, as happens whenever one deals in generalities, the article reflects a rather uncompromising bias toward my trade... what the industry calls "headhunters."

I am particularly sensitive to such feelings because it can prevent companies from realizing the real, tangible benefits that can accrue from using the services of a professional recruiter.

George M. Houchens
Computer Personnel
Specialist

Software Services Corp.
Ann Arbor, Mich.

Bortman Replies

I was disappointed by the article "The Programmer Shortage Is an Illusion." The quotes attributed to me were used to slant the article. The result was a serious distortion of the ideas I intended to convey.

My premise was that the programmer shortage would be mitigated if a company was willing and innovative enough to look beyond its local geography for talent. Pools of technicians exist, particularly in areas of economic depression.

Talented programmers are available if companies will take the effort to seek them out.

The article implies that I, and my company, are adverse to placement agencies. Rand Information Systems, Inc. uses agencies quite extensively and with good results. We have very good relations with these agencies and value the contribution they make to our growing business.

My quotes regarding agencies were made as part of a much larger discussion on the economics of software development and were meant to apply to only a very small number of disreputable agencies.

This article has caused me and my company considerable embarrassment because of its inflammatory tone. I believe that the writer should have verified the intent of my statements with me before publishing them.

Ethan Bortman
Director

Midwest Operations
Business Systems Division
Rand Information Systems
San Francisco

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MARTIN MARIETTA DATA SYSTEMS

HRIS Users: 50% Buy Without RFPs

By Rita Shoor
CW Staff

CHICAGO — Does a software package requirements analysis automatically lead to a formal request for proposal (RFP) from potential vendors? Not always, according to a recent survey of 53 major organizations currently using automated human resource information systems (HRIS).

While a majority of respondents (86%) did, in fact, perform a requirements analysis, only 49% indicated that an RFP was actually issued, according to Towers, Perrin, Forster & Crosby (TPF&C), a consulting firm here. The survey, conducted with the cooperation of the Association of Human Resource System Professionals, Inc., was made via personal interviews and mail responses.

The survey covered companies with average sales in the \$2.55 billion range. Industries represented included manufacturing (20 firms), banking and/or insurance (eight), utilities (seven), food products (four), chemicals (three), business services (three), health care (two), communications (two) and retail (two). The transportation and energy indus-

tries were each represented by one organization.

The fact that less than half of the companies issued an RFP points to a need for human resource executives to become "better trained and more aware of the intricacies of software procurement," according to TPF&C.

Increased Control

In the last five years, the proliferation of minis and micros and improvements in software languages and operating systems have allowed end users to increase their control of software systems. In many cases, this has resulted in an attitude that "almost reflects a 'disposable system,'" the consulting firm noted.

The price of human resource systems has been going down in relation to the features provided by the software, TPF&C said. This has led to a feeling within some organizations that three to five years of service is a realistic expectation from a purchased system. After that time period, the systems are "cheap enough to be scrapped and replaced" if a mistake was made in the original selection process.

So goes the rationale. Survey results

pointed out that the reality is somewhat different. Fifty-six percent of the responding organizations were able to specifically identify costs incurred by the HRIS.

People costs related directly to the system ranged from \$24,000 to \$4.5 million and DP costs — defined as "computer-usage only" — went from \$8,220 to \$2.1 million annually. Including forms costs averaging \$13,495 and a broad "all other" category that averaged \$187,600, the total average annual costs for HRIS at these firms is actually a whopping \$975,167.

The majority of respondents (60%) favored buying a HRIS package rather than developing an in-house system. And, after analyzing the system requirements, 87% of the 38 companies answered the question "was a findings report produced?" in the affirmative. But that seems to be where the process stopped. No RFP was issued at 21 firms and another five respondents "did not know" if an RFP had been generated.

A copy of the survey is available at no charge from Towers, Perrin, Forster & Crosby at Suite 8414, 233 S. Wacker Drive, Chicago, Ill. 60606.

'Genius' Update Runs Under OS

AUSTIN, Texas — Intel Corp. here announced the release of a version of Genius, its report generator, for IBM systems running under the OS operating system.

Genius is an adjunct to the Report Writer feature of Intel's System 2000/80 data base management system. It was designed to produce reports from data in a System 2000/80 data base and reportedly features automatic generation of syntax and user prompting.

Genius essentially operates as a programmer aid to construct and test report definitions before turning them over to end users. It provides summations, simple and complex calculations, intermediate values, data selection and detailed item display, the vendor explained.

Genius is immediately available for IBM/OS users with TSO or VM/CMS and is priced at \$10,000. Intel Corp. is located at 12675 Research Blvd., P.O. Box 9968, Austin, Texas 78766.

Aid Gives OS Cobol Users Structured Documentation

ENGLEWOOD CLIFFS, N.J. — A structured documentation package for Cobol programs which runs on IBM and plug-compatible mainframes under the OS/VS1, OS/SVS and OS/MVS operating systems was announced here by Syncsort, Inc.

Called Sydoc, it reportedly accepts the source code of a Cobol program as input and, after analyzing it, produces a series of reports that reveal the program's structure, components and relationships.

The package's analysis of a Cobol program is presented in seven basic reports: process chart, hierarchy chart, section process table, data chart, source listing cross chart, diagnostic listing and program statistics listings. These charts are said to provide complete information on the internal structure of Cobol programs.

Described as a takeoff on earlier technology, Sydoc is written in Macro assembler

and has about 90,000 lines of code, the vendor said. It reportedly analyzes Cobol programs that are compatible with the IBM ANS and OS/VS Cobol compilers.

Sydoc is priced at \$25,000 for a five-year license with a 12% discount for Syncsort users, the vendor said from 560 Sylvan Ave., Englewood Cliffs, N.J. 07632.

Service Supports RSX-11M Users

MAYNARD, Mass. — A system performance service for its PDP-11 computers running under the RSX-11M operating system was announced here by Digital Equipment Corp.

CPS-11M is said to include license and installation of performance measurement software and on-site training and support by a DEC software specialist.

The software performance monitor, SPM-11M, is an event-driven data collection and reduction instrument that monitors hardware and software resources, including the CPU, memory, I/O and storage devices, file system and task loader. Collected data reportedly is used to analyze resource usage at total system, collective and individual task levels. The monitor aids location of bottlenecks, performance analysis of application programs, measurement of work load trends for planning expansion and system tuning, DEC said.

The CPS-11M service includes 10 days of on-site support by a DEC software specialist, plus a license to use SPM-11M for six months. The specialist will install SPM-11M software, train the customer in techniques of performance measurement and analyze and interpret data collected at the site. The service costs \$9,370 and is renewable for 12 month periods without the services of a DEC specialist for \$4,800, DEC said from Maynard, Mass. 01754.

Turnkey Tests Cobol Systems Without Mainframe Resources

SACRAMENTO, Calif. — Tele-Commuter Systems (TCS) has introduced a turnkey package that reportedly enables programmer teams to develop and unit-test Ansi 74 standard Cobol systems without using mainframe resources.

Communications software is included to transmit the source code to the mainframe for final system testing. Designed to address the need for increased programmer productivity, the package is said to be compatible with IBM and plug-compatible systems and any vendor that can communicate with IBM 3780 communications system.

The TCS workstation hardware includes 64K bytes of main memory; a 5M-byte Winchester disk drive; a direct-memory access I/O controller; a 700K-byte floppy

disk drive; a 25 by 80 char. CRT screen; a real-time clock; a synchronous/asynchronous modem port; a serial printer port; a 2,400 bit/sec synchronous modem and a 150 char./sec matrix printer with graphics capabilities.

Supplied software is said to contain a programmer's menu that provides a full-screen text editor; an Ansi 74 Cobol compiler with an interactive debugger; a program-scan utility; IBM 3780 and 3270 emulators; and component-level diagnostic test utilities. Software runs on the CP/M 2.2 operating system, TCS said.

Programmer training is available from TCS on a time and material basis. The TCS workstation is priced at \$15,000 and is available immediately from TCS at 8655 Quail Oak Way, Orangevale, Calif. 95622.

Why Packaged Software?

Make or buy?

With software development costs rising ever higher and the supply of experienced programmers becoming ever scarcer, the scales are tipping in favor of buying packaged software.

Computerworld will be publishing a Special Report on Applications Packages in January and we want to know how your installation is dealing with decisions regarding packages. Tell us about the ones you have purchased and why you selected them. Explain what motivated you to shop outside for software and how the packages are working within your organization. Have they really proven less

expensive than software developed in-house — and by how much?

Describe how much customization is required with application packages. Have they relieved some of the pressure caused by shortages of DP personnel? Enabled you to make better use of your hardware? Led to changes in equipment?

Please send your experiences and viewpoints (typed, double-spaced and no longer than six pages) by Dec. 4 to Lois Paul, Senior Writer/Software, Computerworld, P.O. Box 880, Framingham, Mass. 01701. Accompanying graphics are welcome.

Stat Sampling Package Out In Batch Mode for 360, 370

NEW YORK — A statistical sampling package for auditors that is available in a batch mode on IBM 360 and 370 mainframes and on the General Electric Information Services Co. (Geisco) time-sharing network was announced here by Coopers and Lybrand.

The Statistical Sampling System is written in ANS Cobol and reportedly can select and evaluate a stratified or unstratified sample based on classical item sampling or sampling with probability proportional to size (PPS).

Its principal functions include summarizing data from a preformatted client file into intervals and produce

a summary frequency distribution along with a histogram; determining stratum boundaries according to user-defined parameters and calculating the sample size required to achieve the planned precision at a specified reliability level.

Other functions are merging the audited results with the selected sample and calculating differences; evaluating an audited item sample and estimating total population values by combined ratio, combined regression and separate regression or difference; and evaluating an audited PPS sample and estimating total population values, using either PPS or monetary unit estimation.

The batch version of the Statistical Sampling System carries a first-year lease of \$12,500; subsequent maintenance leases are available for \$1,000. On the Geisco time-sharing network, the software is priced on a per session basis. Coopers & Lybrand said from Two Park Ave., New York, N.Y. 10016.

Heuristic Offers 'DP Stats' For Datashare

RENTON, Wash. — An interactive statistical system for Datapoint Corp. computers was introduced here by Heuristic Systems.

Called DP Stats, the software was designed to give Datashare users access to statistical functions that are usually limited to large system users, a spokesman said. The package allows users to create raw data files with descriptive statistics or define, extract and compile statistics from existing files. Display and/or print capabilities are also provided, the vendor said.

DP Stats functions include cross-tabulation table reports, frequency distribution tables and histograms, determination of partial and product-moment correlations, breakdowns on data with descriptive statistics, bivariate regressions and dispersion around mean reports, the firm said.

Available immediately, DP Stats costs \$1,250. Price discounts are available for nonprofit organizations, Heuristic said from 15733 S.E. 175th Place, Renton, Wash. 98055.

Package Defines Telephone Usage

FRAMINGHAM, Mass. — Communications Analysis Corp. here introduced a software product designed to enable IBM and plug-compatible equipment users to define their telephone usage and costs.

Management of System Telephone Expenses (Moste) provides reports that record and summarize calls made from a telephone switch. The information is organized in a pyramid-like fashion by extension, the vendor said, and is summarized by department, division and company.

Moste is priced at \$18,500, the vendor said from 100 Fountain St., Framingham, Mass. 01701.

CICS/VS
programs up and running
in hours
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Bull?

You've seen the grand claims the suppliers of applications development software are making. It's no wonder if you're skeptical, or at least a little confused.

But no one in DP management can afford to ignore the productivity opportunities these new products offer. The problem is, with more than a dozen to choose from, how do you navigate the maze of available information, separate fact from wishful thinking, and find the product that is right for you?

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In one day, the Merlyn Corporation's Software Decision Symposium - Series One, can put you in a position to make this all-important decision. The Merlyn Corporation's independent software experts will give you an impartial overview of all the types of productivity aids on the market and some not even released yet. You will learn what productivity gains can really be achieved, and with what limitations and trade-offs. You'll learn how to match products to your specific needs, and avoid the major headaches and costs involved with having to live with the wrong product.

Here's what the symposium offers you:

- A better understanding of the need for such products - including productivity issues, prototyping, end-user programming, improved standards, etc.
- A balanced perspective on DMS/VS, to understand the reasons why alternatives are so popular.
- A thorough review of all the types of development aids available to CICS/VS users.
- An examination of other solutions to the productivity needs of the CICS/VS user.
- An analysis of the limitations, drawbacks, and trade-offs associated with such products.
- A discussion of evaluation techniques - including cost-justification, requirements definition, meaningful product trials, and benchmarks.
- Guidelines for successful product implementation, including security issues and training.
- An examination of the problems of programmer acceptance, and pointers on avoiding them.

In short, the Software Decision Symposium - Series One presents a remarkable opportunity for today's DP manager to find out which productivity claims can be delivered. And which are bull.

Register by calling collect (404) 252-0616, or send in the coupon. Price per person is \$325, but those who register at least four weeks prior to a symposium pay just \$295. Two or more attendees from the same company pay only \$250 per person if registering early.

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MSA

Integrates Graphics, Business 'DSG/3000' Now Backs HP 2623A

PALO ALTO, Calif. — Hewlett-Packard Co.'s Decision Support Graphics software for HP 3000 computers (DSG/3000) now supports the new HP 2623A graphics terminal, the vendor announced here.

With the HP 2623A, HP 3000 users reportedly can integrate graphics into their business reporting procedures. Graphs and charts produced with DSG/3000 may be displayed on

the HP 2647, 2648 and 2623 graphics terminals, the vendor said.

Graphs also may be plotted on the HP 7221, 7220 and 9872 eight-pen plotters or the HP 7240A and 7245 printer/plotters. Multiple charts or presentation-sized flip charts may be produced on the HP 7580 large D-size drafting plotter, according to the vendor.

DSG/3000 is described as a menu-

driven, interactive program that enables users to "fill in the blanks" to produce charts and graphs. Users may enter data charts or graphs directly through a terminal keyboard, or from a data file, V/3000 forms-design package or user-written application programs.

A built-in query facility reportedly enables users to access Image data bases to retrieve data for charts. DSG/3000 separates graph specifications and data so a graph may be stored and later updated by changing the data, without having to re-specify the graph, the vendor said.

DSG/3000 is available now from HP for \$6,300. A self-paced training course is priced at \$275, while the three-day training course is \$555. A reference manual and Quick Reference Guide are available for \$24 and \$4.25, respectively. The HP 2623A graphics terminal is priced at \$3,750. Option 050 adds an optional, integral thermal printer for \$1,210.

Current delivery estimates are 10 weeks, the vendor said from 1820 Embarcadero Road, Palo Alto, Calif. 94303.

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News Utility Fits HP 3000

MOUNTAIN VIEW, Calif. — International Environmental Research, Inc. (IER) has announced a system utility designed to expand the communications capability of Hewlett-Packard Co.'s HP 3000 installations.

The News Communication Facility reportedly allows system management to broadcast news releases to all users and keep track of which news releases each user has received, the vendor said.

The utility costs \$1,800 or leases for \$300/mo from IER at 1916 Old Middlefield Way, Mountain View, Calif. 94043.

Series/1 Gains 'Screen Handler'

CINCINNATI — Tominy, Inc. announced the addition of the Screen Handler to its Data Base-Plus application development system for the IBM Series/1 minicomputer running under the EDX operating system.

The Screen Handler is said to improve transmission speed, reduce memory overhead and eliminate difficulties associated with the creation and use of fixed-format screens.

It reportedly supports IBM 3101-2X-, 4978- and 4979 terminal types. Under Data Base-Plus, a single facility brings up both the Screen Handler and the data base concurrently, the vendor said.

The application program requests a screen-read or screen-write by specifying only the screen name and the unprotected data area within the program, the vendor explained, adding that the Screen Handler supplies the desired format.

Screen formats are created on-line by "drawing" the desired format on a display terminal, according to Tominy. A stand-alone utility is said to allow the user to prototype screens before the application coding actually begins.

The price of the Screen Handler ranges to \$2,500, depending upon the product configuration and the quantity ordered, the vendor said from 4152 Crossgate Drive, Cincinnati, Ohio 45236.

Program for Cybers Handles Seismic Data

MINNEAPOLIS — A software program that reportedly allows seismic field data to be demultiplexed and preprocessed on the same computer has been developed by Control Data Corp.

The Cyber-Demux program is said to allow transfer of seismic field data directly to extended memory where the CDC Map III Array Processor completes many of the preprocessing tasks normally handled by the central processor.

Operable on all Cyber 170 computer systems using NOS/BE or NOS operating systems, the software costs \$30,000 to \$90,000, depending on the system and options selected. CDC can be reached through P.O. Box O, Minneapolis, Minn. 55440.

Descriptor Fits Univac 1100

DENVILLE, N.J. — A general-purpose problem descriptor system for the Sperry Univac 1100 series computers has been announced by Haverly Systems, Inc.

Omni/1100 was originally developed for IBM 360 and 370 computers and has a large international users' base in that environment, the vendor claimed.

Omni/1100 leases for \$965/mo or may be purchased for \$30,000 from Haverly Systems, Inc., 78 Broadway, Denville, N.J. 07834.

Cosmic Offers Two Packages

ATHENS, Ga. — The Computer Software Management and Information Center (Cosmic) of the University of Georgia has introduced a Decision Information Display System (Dids) and Structured Fortran Preprocessor software packages.

Dids is said to be a rapid response information retrieval and color graphics display system developed at the National Aeronautics and Space Administration's Goddard Space Flight Center. The program reportedly is meant to allow users to transform tables of geographically based domestic statistics into color-coded maps on a CRT screen.

Dids (Program No. GSC-12747) runs on Digital Equipment Corp. VAX-11/780 and LSI-11/23 computers. Documentation price is \$41; program price is \$3,775.

Sftran3 is a language designed to support structured programming in a Fortran environment. Machine-independent, program number NPO-15726 costs \$1,215, with documentation priced at \$22 from the center at 112 Barrow Hall, Athens, Ga. 30602.

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IDMS-1982

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CPU UTILIZATION

CINCOM 100%

IBM 181%

ALL OTHERS 183%

EXECUTE TIME

CINCOM 100%

IBM 272%

ALL OTHERS 223%

DISK ACCESS

CINCOM 100%

IBM 196%

ALL OTHERS 221%

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For a detailed report of this benchmark study, along with more about the benefits of converting to TOTAL, contact our Marketing Services Department: 800-543-3040. In Ohio 513-661-6000. In Canada 416-279-4220.

- IDC reports August, 1980; March 1981



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Updated PDP-11, VAX Sort Now Includes Merge Utility

LEXINGTON, Mass. — Evans, Griffiths & Hart, Inc. announced here the release of Version F10 of Fsort3, a sort package for Digital Equipment Corp. PDP-11 processors running under RSTS/E and VAX-11 machines under VMS.

Fsort3 reportedly is a machine-language package for sorting unblocked and blocked files of fixed-length records. The F10 release includes a merge utility that can be used either to merge or concatenate up to 11 input files into a single output file, the vendor said.

The input files may be of different types from one another and from the output file, according to the vendor.

The merge utility reportedly can be used to convert files from one type to another and to replace records in a master file with corresponding records from an update file.

The new release is said to support record management service (RMS) sequential fixed-length record files, both span and no-span. To support RMS files and virtual arrays, the vendor has added a PDP-11 internal-format integer, an unsigned PDP-11 floating point number and a PDP-11 internal-format floating point number. Fsort3 Version F10 is available for \$2,500 for a single CPU license from Evans, Griffiths & Hart, Inc., 55 Waltham St., Lexington, Mass. 02173.

'Toolbox' Simplifies Cobol For Honeywell Level 6, DPS

PHOENIX — A software enhancement package designed to facilitate generation of Cobol applications within acceptable performance standards for users of Honeywell, Inc. Level 6 and DPS computers has been announced by Independent Computer Systems, Inc.

Toolbox consists of 120 utilities and subsystems and contains four modules, including shareable run-time routines, monitoring and debugging aids, productivity aids and assembly macros, the company said.

Toolbox requires Honeywell's Gcos Mod 400 operating system and does not modify Honeywell software, the vendor claimed.

Toolbox is priced at \$7,500 with

quantity discounts available from Independent Computer Systems, Suite 106, 8686 N. Central, Phoenix, Ariz. 85020.

Package Aids Manufacturers

ROCKVILLE, Md. — A computer-based manufacturing, planning and control software package said to use an English-like, nonprocedural command language has been announced for time-sharing users and for users of IBM mainframes by General Electric Information Services Co.

Mims-MFG is available to manufacturers who have contracted for the company's Mims system, an integrated, time-sharing storage and retrieval system.

The package was designed to enable a manufacturer to rapidly computerize many manufacturing functions by reducing programming time required for installation and use of a customized computer system, the vendor claimed. The package offers nine subsystems including master scheduling, shop calendar, product costing, material requirements planning, as well as control subsystems for bill of material, purchasing, production, inventory and parts.

The package can be used on Mark 3000, Geisco's IBM-compatible remote computing service or can be licensed for use on in-house IBM-compatible systems.

Pricing information for Mims-MFG is available from General Electric Information Services Co., 41 N. Washington St., Rockville, Md. 20850.



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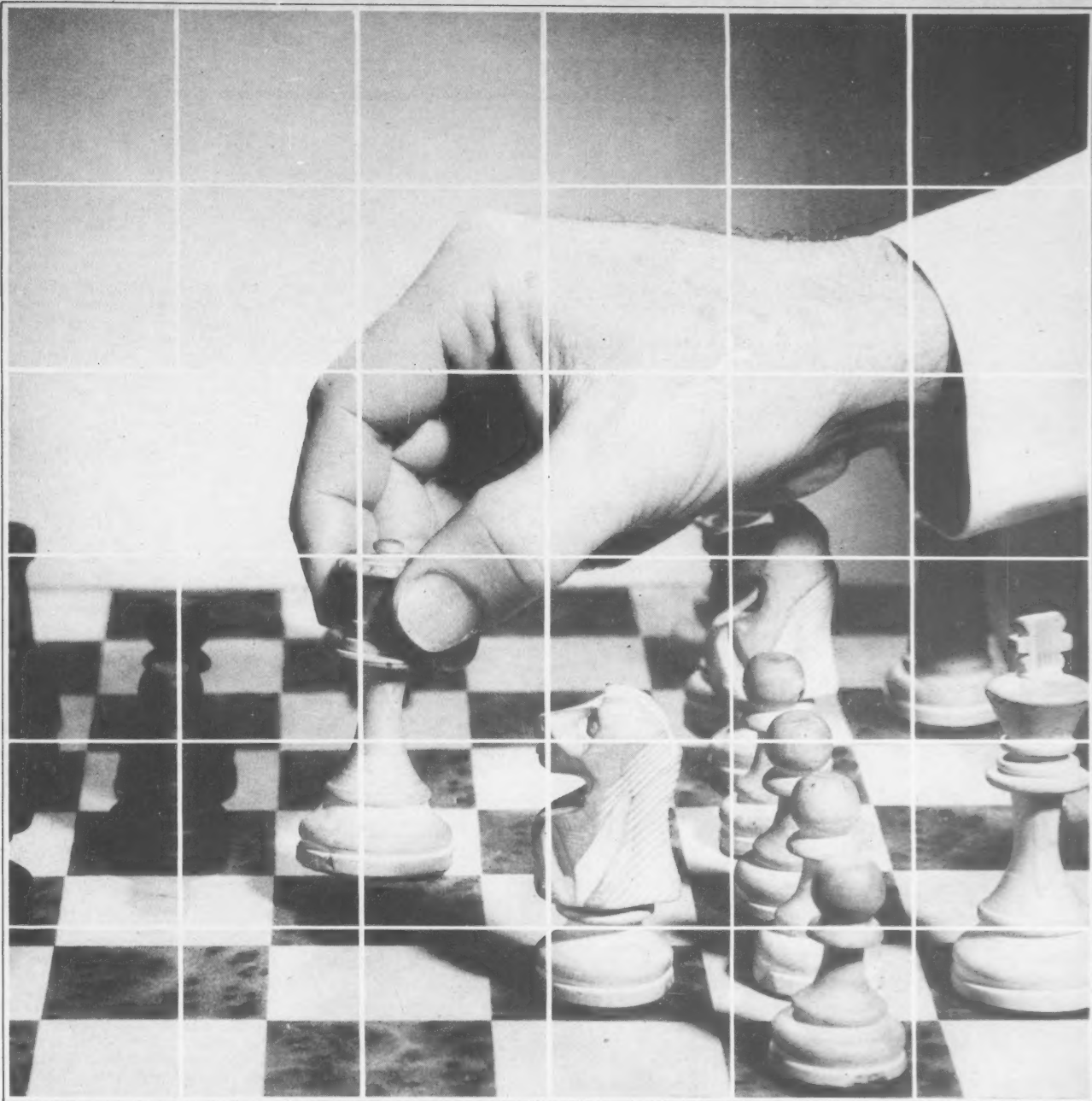
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IBM's SYSTEM SOFTWARE STRATEGY FOR THE '80s

IBM'S DOMINANT POSITION in the industry causes its strategy to have a substantial impact on users, software vendors and other hardware vendors. While it is not possible to predict exactly what IBM will do, one can try to look at the world from IBM's perspective and speculate from there. IBM faces many of the same financial and strategic constraints as the industry in general, albeit on a larger scale.

IBM clearly does not have unlimited resources to focus

on a broad universe of problems. Therefore, an examination of IBM's current situation, the external economic environment, future needs and the tools available to IBM in addressing these needs yields an interesting forecast of IBM's system software strategy for the 1980s.

Today's Environment

IBM has made massive capital investments in plant, equipment and automated manufacturing technology to engage "Japan, Inc." in the

By
Robert Cook

battle to be the world's low-cost producer of hardware components. In order for this hardware investment to have lasting value, a corresponding investment must be made in both application and system software.

Application software has traditionally been the domain of the customer and the independent software vendor. IBM has traditionally

provided system software (the operating system [OS] or System Control Program [SCP]). As a result of increased microcoding efforts by IBM, it now appears that the distinction between system software and hardware has begun to fade.

Microcode assists (software logic implemented as micro-coded hardware) have already begun to show substantial benefits to the user, who is getting far better system performance from a hardware/microcode/system

software implementation than was possible in a hardware/system software implementation alone. Examples of this enhanced performance may be found in IBM's microcode for the VM Assist (VMA), MVS System Products (MVS/SP) and even in the APL assist available on the 370/148. Of course, this trend continues with new microcode products.

Another attraction to IBM of implementing new software logic as microcode is that this strategy forces com-

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peting 370-compatible hardware vendors to invest money in system software to remain competitive. In the past 20 years, much system software was "free" and could be implemented as easily on a competitive computer as on one of IBM's. Thus, IBM's competitors incurred lower software development costs than IBM, since they did not need to invest as heavily in system software development.

IBM's future investment in soft-

ware and related microcoded software must be made in a strategic framework that meets the needs of the customer. As the 1980s begin, it is interesting to consider the five-year forecasts of economic conditions in the computer business, examine briefly what the market is likely to demand and then make some informed speculations about IBM's response to those demands.

The first and perhaps most critical factor is the shortage of qualified

programmers. In 1975, 10% to 15% of the demand for programmers was not met. By 1985, the shortfall of programmers is expected to be 45% to 50% of demand. Even today, the backlog of programming tasks facing the average Fortune 500 company is 2½ years. This is clearly an intolerable situation, yet one that is forecast to grow even worse.

Are there solutions to this problem? Perhaps. One approach to a solution is to divide it into two parts. The first

part is to increase programmer productivity; the second is to find a way to attack the source of the programming backlog — the end user, the person whose demands generate the programming requirements.

Probably the most powerful way to attack the problem of programmer productivity is to expend more of an inexpensive resource (computer cycles) to gain more of an expensive resource (programmer productivity). One major portion of this approach is known as interactive program development. Interactive program development allows the programmer to correspond with the computer using a terminal on a real-time basis and get nearly instantaneous responses and diagnostics from the computer for each line of code entered.

At its first level of sophistication, interaction provides a full set of program development software tools to give programmers instant assistance. When a project is completed, the time-saving benefits of interaction are often passed on to the end user, who may save further valuable time while utilizing the results of the programming effort. The efficacy of this approach to improving programmer productivity is illustrated by the phenomenal success of the hardware vendors devoted primarily to building interactive systems, for example, Digital Equipment Corp., Data General Corp., Wang Laboratories, Inc. and Prime Computer, Inc.

Approach No. 2

A second approach to cutting the size of the programming backlog is to handle the end user's needs more efficiently. Traditionally, the end user determines a requirement for computer support, communicates it to the data processing department, has a design and programmer team assigned to code and test the resulting program or programs and then begins to use the finished product.

The most difficult part of this effort is not the design and coding; rather, it is the iterative communication process required for the data processing people to fully understand, on the first try, the end user's requirement. Several iterations of a requirements document are almost always required, since it is difficult for even a senior programmer or analyst to fully understand the subtleties of a requirement in such specialized business disciplines as finance or marketing.

Even worse, the full requirements, design, coding and testing process is often so long that the finished product addresses a need that existed several months or even several years earlier, but has changed substantially in the interim.

If a method can be devised to allow some substantial portion of the end-user community to solve its information processing problems without the direct involvement of programmers or analysts, the growth of the programming backlog can be

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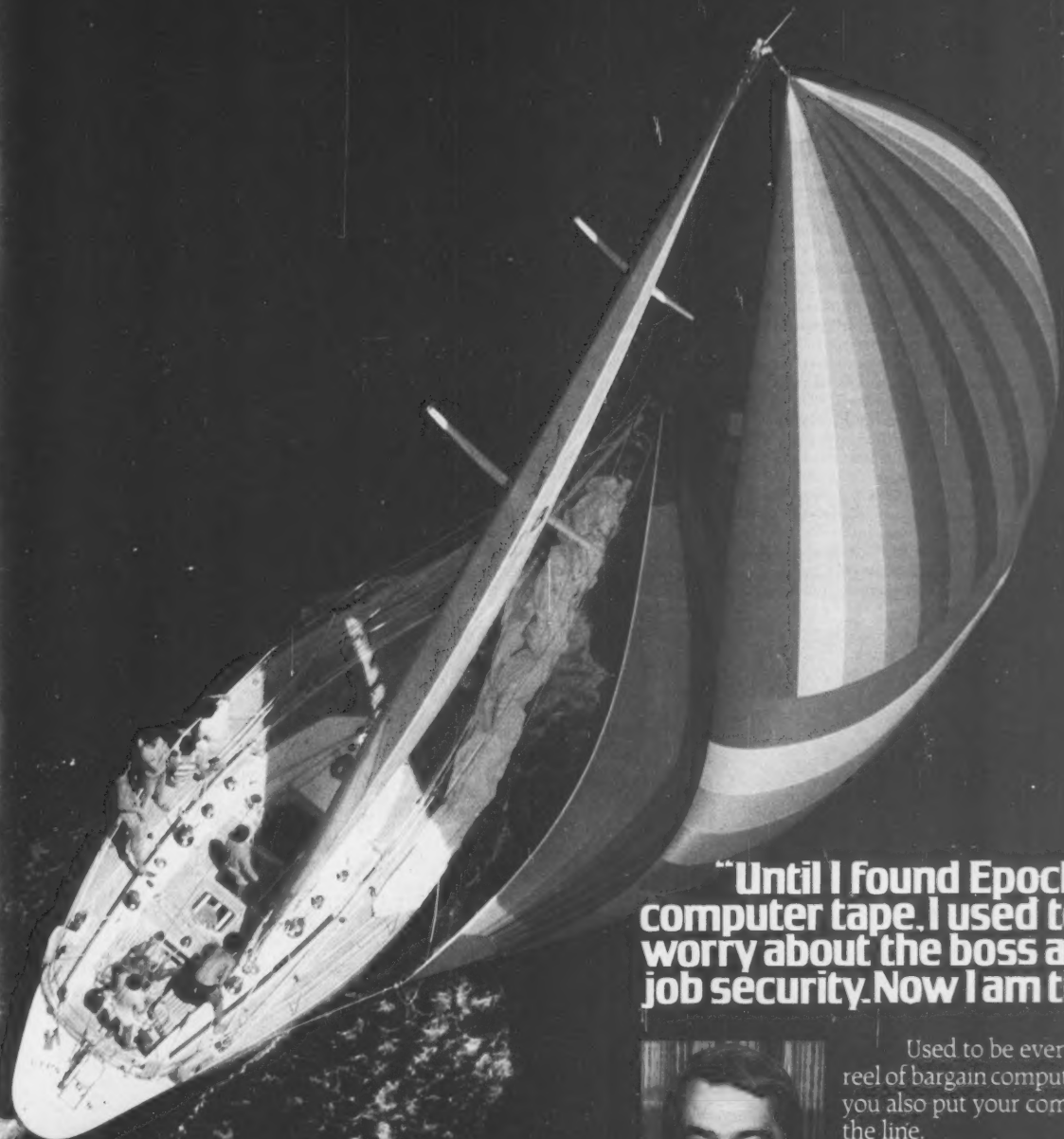
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slowed, if not arrested. Further, the end-user community can provide an entirely new market for the hardware vendor, such as IBM, which has traditionally targeted the data processing professional as its primary prospect.

IBM's products have, as a rule, been operating systems and language processors. Since the end user is unlikely to be motivated to gain formal programming skills in order to use today's language processors effectively, the products offered to the end user community must be far more sophisticated than the standard set.

Of course, the end-user products must be interactive. They must be "user-friendly," that is, provide an easy-to-use interface to the computer, with rapid response time and an English-like user language. Any requirement for extensive end-user programming on the finished product will likely ensure its demise.

What Does IBM Have in Its Software Tool Kit?

• **MVS (OS/VS2).** The first system software product that comes to mind is IBM's premier operating system,

OS/VS2 (MVS). MVS is an acronym for Multiple Virtual Storage. For more than five years, IBM has promoted MVS as its premier strategic system software product since it is a superior batch processor and the computer work load in the '70s was predominantly batch.

MVS has inherent interactive terminal support capabilities provided by its Time Sharing Option (TSO). MVS provides an interface to IBM's IMS data management system and is installed on most of IBM's large computers in use today.

For the large user, MVS can run in a coordinated structure on more than one CPU — this is known as a multiprocessor (MP) capability.

Many Fortune 1000 companies have made a commitment to MVS at IBM's urging, so the vendor cannot drop or deemphasize it. These large companies are the backbone of IBM's market. On the other hand, these same large companies have been buying computers by the thousands, not from IBM but from hardware vendors with superior interactive capabilities.

It has become clear that MVS has not and cannot compete effectively in the interactive marketplace. Its

batch processing features and function, however, are without peer. And batch processing still comprises the vast majority of information processing work accomplished today. Payroll, billing, order entry, inventory control, insurance premium accounting and bank demand deposit accounting are but a few of the massive batch applications running today in tens of thousands of organizations around the world.

However, most of the remaining applications in the present or future programming backlog will probably not be batch. Most of the batch-oriented backlog has been conquered; the future belongs to interactive. But where does that leave MVS? It is a clear leader in processing today's computing work load, but it is decidedly weak in meeting tomorrow's needs.

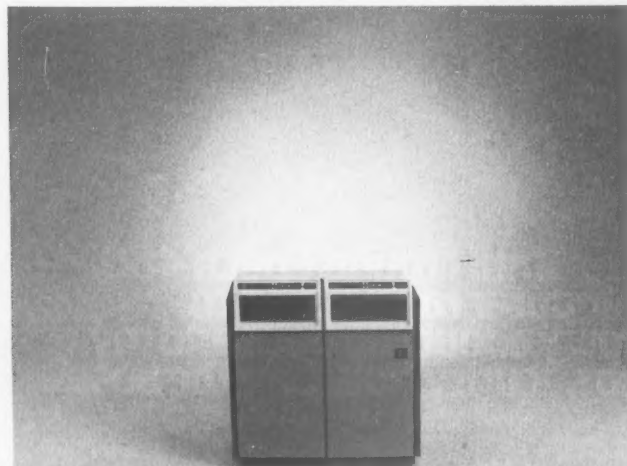
• **DOS.** DOS is IBM's operating system for the new or small 370 user. It is small and simple and provides most of the features and functions required for a relatively unsophisticated set of processing needs. It has a comparatively strong batch capability and weak interactive capability. DOS seems more than adequate for

the current needs of the small user, but given time, little acorns tend to turn into giant oaks.

What happens when the DOS user company triples or quadruples in size and its computer work load grows even faster? Does the user run four 4341s under DOS and attempt to set up communications between them? Alas, the simplicity of DOS makes this quite cumbersome, if not impractical. The corporate data base just does not lend itself to being spread across several computers that do not talk to each other readily. DOS does not have a multiprocessor capability.

IBM is, of course, ready with the solution. The now-large DOS user should convert to MVS! How? Well, it can keep running DOS on its four 4341s and buy another large 4341 (or even a 30 series machine) for MVS. That will allow the user to begin converting its DOS work to the new 4341 running MVS.

Okay. Even if I have to buy a new processor that will not allow me to access my DOS data bases and it is unproductive for a while, I can get all my DOS work load onto two or three 4341s. Under MVS, the processor has more features and functions,



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right? Wrong! Since MVS is so much larger and more complex than DOS, it takes *more* machine cycles to support the operating systems and you can run *less* productive work on your 4341 under MVS than you can under the same 4341 system running DOS.

If you think this dialogue seems a bit surreal, think how the DOS user feels. But there is hope. The DOS technology is good for the small user and some form of IBM's 370 architecture can be readily brought to much smaller and cheaper technologies. Wouldn't a 32K DOS system in a smart desktop terminal be nice? Nicer yet since it could be made to talk readily to large 370 systems!

- **VS1.** OS/VS1 fits somewhere in the middle of DOS and MVS in terms of features and functions. It is too large for the small user and too small for the large user. IBM is not devoting a significant amount of development dollars to VS/1. It is a transition technology that IBM cannot afford and does not need to enhance over the long term. It is not a strategic product for IBM and will not be addressed further.

- **VM.** VM is an acronym for Virtual Machine. This operating system

was developed in the mid- to late '60s by IBM's Cambridge Scientific Center. Back then, it used a technology not entirely compatible with IBM's 360 line, since it required an extra piece of hardware to operate — a Dynamic Address Translation (DAT) box — and a new operating system concept, paging, to be efficient. Of course, shortly after the 370 line was announced in the '70s, the DAT box and paging concept became an integral part of IBM's system software strategy.

VM was oriented largely to interactive program development and testing efforts for systems programmers and contained two distinct operating system components, the Control Program (CP) and the Cambridge Monitor System (CMS). CP was, and still is, a small, highly efficient system software component that allows each terminal user to have the illusion of having an entire computer system dedicated to that user's personal needs.

The user had an operating system, a console, a CPU, disk drives, tape drives, main memory or anything else that could be requested in a stand-alone computer processing environment.

Since a single user could not be expected to keep a modern computer system busy, it was possible for CP to have a number of terminal users running their own computer "systems," each of whom had the illusion of running a personalized, dedicated computer system. Each user had its own "virtual machine."

This was particularly attractive to the systems programmer trying to do a complex Sysgen or operating system modification, since such code could be thoroughly tested without crashing the "real" machine — only the "virtual" machine was affected. While useful, this concept has little apparent impact on the interactive program development environment for the terminal user. Enter CMS.

- **CMS.** The Cambridge Monitor System was the second software component of this new operating system called VM. CMS was a virtual machine oriented to enhancing the productivity of the terminal user in an interactive program development environment, under the control of CP, of course. CMS contained a highly sophisticated on-line editor to enhance the productivity of the end user. It also used the standard OS

compilers and assemblers to allow programs completed and tested under CMS to be compiled and executed under an IBM batch operating system such as OS or DOS.

This was a valuable feature, since a programmer could be highly productive in an interactive program development environment yet run the results of that programming effort on one of IBM's efficient batch processing environments, which were, and continue to be, IBM's main line system software environments.

Interactive program development burned more computer cycles than the traditional batch programming approach. Computer cycles were expensive in the late '60s and early '70s, while programming talent was relatively cheap.

Still, for five years this VM operating system continued to slowly gain supporters, even though interactive program development was not in vogue. During this period, VM, known then as CP/CMS or CP/67, was provided free by IBM as an unsupported product.

Finally, in 1972, IBM adopted CP/CMS as a supported product and gave it the name VM. The Cambridge Monitor System name was changed



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to the Conversational Monitor System, but was still known as CMS.

Rumor has it that IBM's president at that time, T. Vincent Learson, went to a presentation by the MVS development group on why VM should be "killed," rather than released as a supported product. Upon completion of the presentation, Learson was given a tour of MVS development activities and found that the MVS people were running MVS under VM. Learson reportedly said, "If it is good

enough for IBM to use, it is good enough for our customers" — and VM became a supported product.

Even then, since VM had no formal sponsorship, IBM followed a policy of benign neglect toward VM, seeming to hope it would go away. The idea of providing support to another major operating system did not appear to appeal to IBM, since MVS was taking shape and promised to be a massive investment. On the other hand, some major loyal IBM customers

had made a commitment to VM and an overt move to kill it could have caused unnecessary problems.

Boeing, for example, had built a major remote computer services offering based on VM. And Boeing is one of IBM's largest and most loyal customers. So, rather than make a decision to kill VM, IBM seemed to continue the approach of benign neglect. Development resources for VM were minimal compared with those devoted by IBM to MVS in the

late '70s.

At this same time, however, more and more remote computer services firms were making a commitment to VM. This was probably a result of the discovery that, on the average, VM would support at least twice as many interactive terminal users as MVS on a given computer. These firms were widely recognized as leaders in the efficient use of computer technology. By 1980, such firms as Tymshare, Inc., Scientific Time Sharing Corp., Boeing Computer Services, Interactive Data Corp. and Informatics, Inc. had made a serious commitment to VM. National CSS had been founded and continues with a commitment to the same technology.

Computer Sciences Corp.'s Infonet Division has finally made its first move outside the Univac arena. Its system software choice was VM.

With all its interactive efficiency, however, VM is a relatively inefficient batch processor. It lacks much of the features and functions of MVS in the batch environment. There is no reasonable access to IBM's IMS data management system under VM, yet data management is by all accounts a critical management concern for the '80s.

With all its investments in system software over the years, IBM still does not have an integrated operating system that will meet the user's needs for today and tomorrow. With a little more analysis and some logical speculation, however, it can all be made to come together.

Tomorrow's Solution

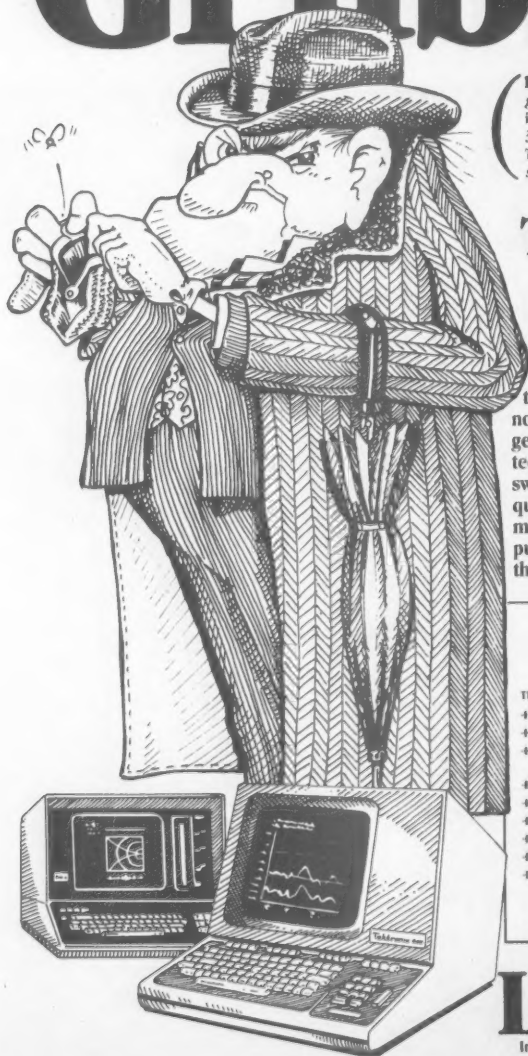
So far we have examined briefly the strengths and weaknesses of some of IBM's system software offerings as well as the external economic environment to be expected by our industry in the '80s. We found that MVS is a good, if not great, batch system with marginally adequate interactive capabilities, running best on very large computers.

We found that DOS is a good system for the small (4300 series) user, but totally inadequate for the large user. Worse, it holds fairly serious problems when a DOS-to-MVS conversion is contemplated by the user. We speculated that VS/1 is a dying technology — one that IBM does not consider strategic. Finally, we looked at VM.

VM's Conversational Monitor System (VM/CMS) is considered to be a superior interactive system, often capable of supporting at least twice as many simultaneous interactive terminal users as MVS on a given IBM-compatible computer system.

VM also has the unique capability of running "virtual machines" such that three different terminal users can have the illusion of respectively having, for example, a dedicated DOS machine, a dedicated MVS machine and a dedicated VM/CMS machine. For the system programmer, one attraction of a virtual machine is that operating system changes can be

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tested without endangering the "real" machine environment. If the system crashes, only the "virtual" machine goes down. The real system continues to operate routinely. Finally, VM has weak batch processing support capabilities when compared with MVS — it lacks certain major features and functions as well.

Given this collection of operating systems with which to address the 1980s computing environment, what would be a reasonable strategy for

IBM? A very strong case can be made that VM is IBM's "sleeping" system software of the 1980s. This unheralded, often ignored operating system contains many of the ingredients necessary for IBM to construct a unified, cohesive system software strategy that will be a competitive nightmare for vendors of 370-compatible computers and the Japanese firms as well.

With careful nurturing and reasonable investment by IBM, VM can and

probably will be the master tool that allows IBM to successfully address the interactive program development environment, the demands of the end user, distributed data processing and the problem of converting from one operating system to another.

Perhaps most important, VM offers a solution to the problem of providing loyal IBM users an evolutionary growth environment that will allow them to run all their application pro-

grams developed in the traditional 370 environment while still being able to take advantage of new software and hardware technology that will greatly enhance the users' future productivity.

The Interactive Program Development Environment

Of all IBM's operating systems, VM is the clear leader in support of interactive terminal users. The large, sophisticated IBM users have long been ardent VM supporters and have voiced this support both through the Share and Guide organizations and through direct contact with IBM.

The reason for this devotion to VM is clear. VM will support, with CMS, many more simultaneous interactive terminal users than MVS on a given computer system. That is clear cost-effectiveness in an increasingly important arena. The VM/CMS on-line editor has more features and functions than the editor available under the Time Sharing Option (TSO) of MVS.

The cumbersome batch conventions such as Job Control Language (JCL) are not required in VM/CMS. The VM system is inherently more secure than MVS or DOS as a result of its virtual machine architecture, which provides fixed boundaries between users and rigidly defines the interface for communications between users with common data bases. VM provides an environment that will allow an organization to run different operating systems on the same computer system — a distinct strategic advantage. But more about that later.

To facilitate its marketing focus on VM's powerful program development aids, IBM has recently coined the term "Development Center" and conceptually packaged many of VM's features into a presentation designed to promote greatly increased use of VM as an interactive program development system to enhance programmer productivity.

The End-User Support Environment

The initial nonnegotiable demand for an end-user support environment is that the system be interactive. VM is IBM's newly chosen strategic interactive operating system.

A second important requirement is that the computer system be user-friendly and easy to use. VM's CMS has no peer within the IBM operating systems family in these two areas. To further strengthen VM's position as IBM's premier interactive operating system, IBM has designated VM as the preferred host for its only truly interactive programming language, APL (A Programming Language).

IBM has further stated that new interactive products will be released first under VM. Of course, even VM/CMS can not provide the English language capability and in-depth function required to enable the end user to eliminate the programmer



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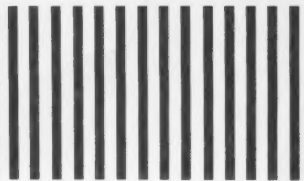
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from the process of solving the end user's problems. For that, a comprehensive set of end-user tools must be developed and implemented by IBM or independent application software vendors. Within IBM, initial efforts are under way to provide these tools, with VM as the host operating system environment.

In initial, highly successful marketing efforts, IBM has chosen the title "Information Center" to describe the package of products offered to the

end user. Today's Information Center offering consists of only a few end-user tools, all oriented to workers in a financial environment. The Information Center contains the Financial Planning System (FPS), A Departmental Reporting System (ADRS) and APL/Data Interface (APL/DI). FPS is a financial forecasting tool, ADRS is a budgeting and quick report generation tool and APL/DI provides more powerful file management capabilities than are

available in IBM's standard APL offering. Each of these products is written in or for APL — another bold step for traditionally conservative IBM.

The Distributed Processing Environment

Distributed data processing has been a popular topic of discussion and speculation for several years. Many hardware vendors have successfully adopted a distributed pro-

cessing strategy and architecture and delivered hardware and software to customers. IBM, on the other hand, chose to announce its 8100 computer system as a distributed processing vehicle.

The 8100 has been less than wildly successful. It is rumored that IBM received less than half the orders it expected for 8100s. That's not too surprising. The fact that the 8100 was "buggy" when released, combined with the fact that neither the 8100 hardware nor its software were truly 370-compatible, led to hesitation on the part of major prospects.

Within another division of IBM, a major new effort in the distributed processing arena was taking place. The approach within this effort offered 370 compatibility in both hardware and software — a major advantage. Further, this approach offered a way for computer users to slow the growth of their computing center staff, while simultaneously increasing installation control of the entire distributed processing environment. In short, this was just what the user community had been demanding.

The new distributed processing approach, known within IBM as Hydra and developed at IBM's Cambridge Scientific Center, involves distributed 4300s that are "operatorless." The actual control of the operatorless 4300, known as a drone, is carried out from a central site, with the assist of a preprogrammed microprocessor at the drone site.

Systems programming support, maintenance and operator control will be downloaded electronically from the central site, thus providing a huge savings for major computer users by dramatically reducing the total staff required to effectively operate a complex corporate computer environment.

The system software host for Hydra is, of course, VM. Hydra features are expected to appear soon as a part of a scheduled release of VM.

The importance of IBM's Systems Network Architecture (SNA) should not be ignored in any discussion of systems software architecture. In distributed processing, SNA is likely to be the control vehicle for interconnection of a distributed network of computer systems. Although only the outer edges of SNA have been seen to date, it is an integral portion of IBM's strategic plan, and the company is very serious about it.

The DOS-to-MVS Conversion Problem

The problem of program conversion from one IBM operating system to another is greatly eased in the VM environment. The user can run both a DOS virtual machine and an MVS virtual machine on the same computer. Even better, program development and conversion can be accomplished using the extremely powerful productivity tools found in VM/CMS.

At any point in time, therefore, one portion of an end user's work load

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IN DEPTH

can be running productively under DOS and the portion of the end user work load already converted to MVS can be running there, while programmers continue conversion efforts using the power of VM/CMS — all on one computer.

The users who worry about programmers getting "hooked" on the power and productivity of VM/CMS need not worry. The good news is that VM/CMS is IBM's strategic interactive operating system. Users who rely on it will continue to reap short-term benefits such as those found in SCP conversions and gain even greater benefits as VM's role in IBM's software strategy for the '80s emerges.

In the case of DOS running under VM, there are some widely unrecognized, but surprising benefits. One should logically expect an operating system such as DOS to run somewhat slower under VM than on a stand-alone basis with a dedicated machine. It stands to reason that the overhead from VM's Control Program (CP) running the real machine must be added to the overhead from DOS running within the virtual machine to determine how much available productive capacity remains on the machine. Right?

Wrong! (At least not always.) Strangely enough, DOS sometimes runs faster under VM than on a dedicated machine; it usually runs at least as fast. Basically, the paging algorithm used by VM is so much more efficient and extensive than DOS's approach that a net gain in productive capacity is often achieved.

How Can It All Come Together?

A major problem for IBM is how to blend its strategic operating systems (MVS, DOS and VM) to exploit their strengths and minimize their weaknesses in a single, modular system software architecture.

IBM faces some obvious major constraints:

1. The large user's investment in MVS must be protected.
2. The basic 370 architecture must be enhanced in a way that allows existing 370 application software to run without conversion, while allowing future efforts to take advantage of the new technology.

3. IBM must make a strategic commitment to interactive computing if the company is to maintain worldwide market share.

Within these constraints and with its available resources, IBM has at least one realistic option. Though it is not possible to forecast precisely the details of the system software architecture that will evolve, one highly logical framework seems both clear and supported by IBM's recent statements and announcements.

The Prediction

VM will become the primary terminal interface and the master control vehicle for IBM's system software architecture. MVS will evolve as the

batch processing component of this architecture and, as such, will be the workhorse of the system in the early '80s. As mentioned earlier, batch work comprises the vast majority of today's production work load, but will be a far smaller portion of future systems to be developed.

DOS, as a small, simple system, will be pushed much further down the 370 architecture. For example, with hardware technology continuing its movement down the price/perfor-

mance curve, it is not difficult to envision at some point in the future a "smart" terminal that contains a full 16K- or 32K-byte DOS system.

This will give the smart terminal user a chance to build application software that is compatible with the DOS systems on the 4300 series. It will also provide IBM with a terminal networking environment on small computers that is particularly easy to implement as a result of the exact compatibility of the intelligent

terminal and small computer's system software.

This article will not discuss DOS further, since the large system architecture constitutes IBM's greatest system software problem and really drives the environment within which DOS must function.

One other alternative available to IBM is to select VM/CMS, rather than DOS, as the system software architecture to be pushed down into the smart desktop terminal. This

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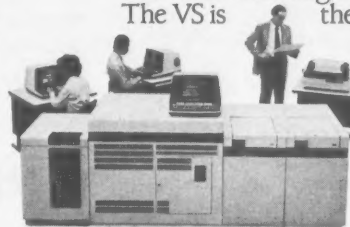
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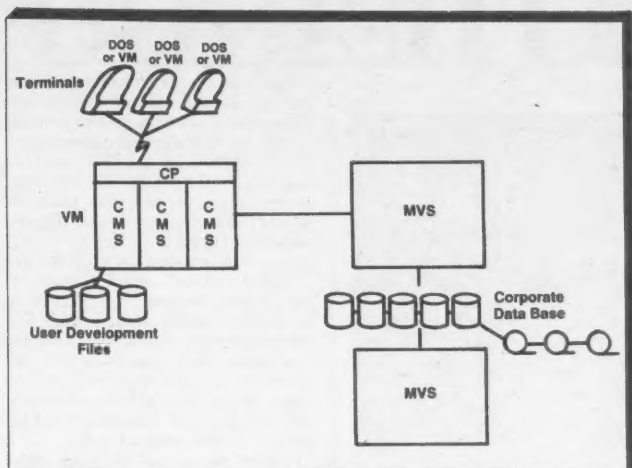


Figure 1

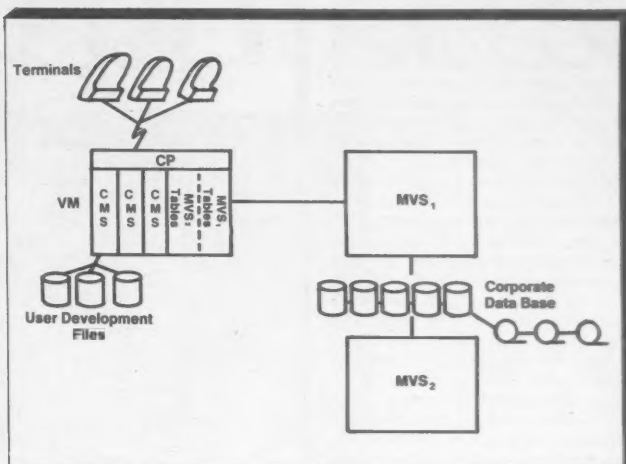


Figure 2

would provide the advantage of having VM/CMS run on every IBM 370-compatible processor from a smart terminal to the largest processor available and would obviate the need for conversion and retraining at any point in the user's growth cycle. Since IBM and many others have observed that computer users usually want to "stay with what they start with," this approach may make good sense to IBM's leaders. The concept is strategically sound.

A VM-driven large user environment might be as shown in Figure 1. In this example, users will initiate batch jobs to MVS through VM, allowing MVS to be finely tuned for the batch environment it handles so well. Program development will be handled interactively through VM/CMS.

The next level of sophistication in the example might be to use the virtual machine capabilities of VM to enhance the reliability of the entire environment. In this case, VM would

carry many of the control tables (called "shadow tables" in VM parlance) of the MVS systems so that if a real MVS machine went down, VM would pick up the work load with an MVS virtual machine identical to the real MVS machine that went down.

In this case, the user could notice a degradation of response time as a result of the increased demand for CPU cycles on the VM machine, but little or no productive work would be lost. This example would be similar to the first (see Figure 2).

What About Data Base Management Under VM?

VM has a terribly weak interface to IBM's IMS data base manager when compared with MVS. It is unlikely that IBM will address this problem directly. Instead, IBM will make VM wait for a new strategic data base manager that is better suited for the interactive environment.

IBM's data base management strategy will follow the conceptual line of

its operating system strategy. Its strategic data base manager must be suitable for direct use by the end user as well as suitable for the total corporate data base structure now served by IMS. That means it must be both interactive and user-friendly.

IMS does not fill the bill; it is cumbersome, difficult to use and employs 10-year-old software technology. IMS has serious structural limitations in the free-form "what is" environment that constitutes much of end-user demand. Its archi-

ture is basically hierarchical, rather than the more flexible network or relational approach.

IBM is devoted to a relational data base architecture for the 1980s and beyond. This relational technology will fill the bill. Known in the industry as System R, IBM's relational data base has been under development for years, and its capabilities are now beginning to be released. Two of the first pieces of the relational technology released as software products by IBM were Query by Example (QBE)

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IN DEPTH

under VM and SQL (under DOS). The Sequel (Structured English Query Language) command structure published by IBM for relational data base management has already been adopted by several independent vendors of relational data base management software products.

In the tradition of evolution, IBM's relational manager will have a DL/1 capability to ensure that existing IMS programs can run without conversion, while new programs can take advantage of the new technology. It is likely that IBM will choose not to traumatize its users by dropping IMS. Rather, it may announce a relational extension to IMS that will initially replace IMS for new applications. Conversion from the "old" IMS will be user-driven, as a result of superior features and functions in the relational system, rather than forced directly by IBM.

Since relational data base technology burns considerably more cycles than conventional data base technology, it is likely that IBM will micro-code large portions of the system to enhance efficiency. It seems reasonable to assume that at some point, IBM will release some form of a data base computer, with extensive micro-

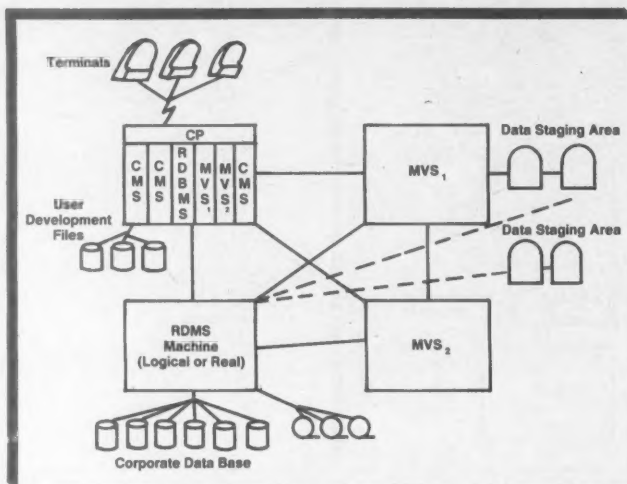


Figure 3

code enhancements and an ability to provide a logical increase in the number of I/O channels available through increased intelligence in I/O controllers.

Further, it is likely that staging of data can take place in this environ-

ment. For example, when an MVS job is submitted through VM to be executed, VM directs the data base machine to extract the appropriate data from mass storage, deliver it to a staging area in MVS memory and notify MVS of the delivery. When the

batch job is initiated, the required data is ready to be utilized by the MVS job.

This enhancement could provide substantial throughput benefits to installations with large batch work loads. In this example, distributed 4300s begin to appear from the Hydra environment mentioned earlier. If this does happen, our example would look like the environment shown in Figure 3.

At this point, the power of this architecture takes shape. With a networked complex of processors as shown, reliability and availability are substantially higher than is possible today. Each processor can be tuned for a given specialized set of tasks, while VM/CMS handles both the Development Center and Information Center terminal users.

Further, the virtual machine capability of VM allows the work load of any of the other processors to be absorbed by VM in the case of a system crash, with no downtime apparent to the user.

Finally, the virtual machine concept provides a growth path for the user, not only in the case of a conversion such as DOS to MVS, but in the case of a user wanting to use the rela-

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IN DEPTH

tional data base machine capability, but not yet being able to cost justify a "real" data base machine. The initial efforts are accomplished in a "virtual" data base machine, then a real data base machine can be installed when needed.

How Can Basic Changes Be Made to 370 Architecture?

One major problem IBM faces is how to make fundamental changes to the 370 architecture without im-

pacting the huge base of existing production programs. For example, the largest IBM users are encountering serious capacity problems caused by the addressing limitations of the 370 architecture.

There is currently no convenient way for a program to address beyond 24 bits (2 to the 24th power), or 16M bytes. If the problem is fixed in the hardware, the logical place, old programs probably will not work properly on the newly designed hard-

ware.

Although a "work-around" has been made in MVS and another is available, the basic problem remains. In VM's virtual machine environment, however, a solution may be available.

If a new architecture were devised to address a host of basic problems, the users could utilize this architecture in a separate set of virtual (and real) machines, while the "old" programs continued to run routinely.

This would avoid the problems IBM faced in its last architecture change to 360, where even today new 4300 series processors must have the ability to run programs in 1401 emulation mode. In this case, VM running as a master control system could ensure that production programs were directed to the appropriate architectural environment.

Over the short term, there is little doubt that VM will grow quickly. IBM has recently stated that VM "is a highly strategic product." The company has demonstrated its growing commitment to interactive computing through the marketing of the Information Center and Development Center concepts, both of which rely primarily on VM as a host.

IBM has stated its dedication to relational data management as a strategic technology, which is interactive by nature. In the distributed data processing environment, the VM's Hydra system seems to offer great promise. To back all of this up, IBM has transferred one of its top development managers from MVS to VM and substantially increased the staffing of the VM development group. "Big Blue" looks committed.

VM has become IBM's premier operating system for general-purpose interactive computing. With the market demand for interaction as heavy as it is, it is difficult to see how VM could be anything but a winner. If IBM continues to evolve toward this system software strategy, there will be two more winners — IBM and its customers. VM is truly IBM's "software sleeper" of the '80s.

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About the Author



Robert E. Cook is president of VM Software, Inc. in Falls Church, Va. Until August, he was a senior vice-president at STSC, Inc., a VM/370-based remote computer services firm. Earlier, Cook was product line manager, time sales, for Boeing Computer Services, where he was responsible for both MVS-based and VM-based remote computer services products.

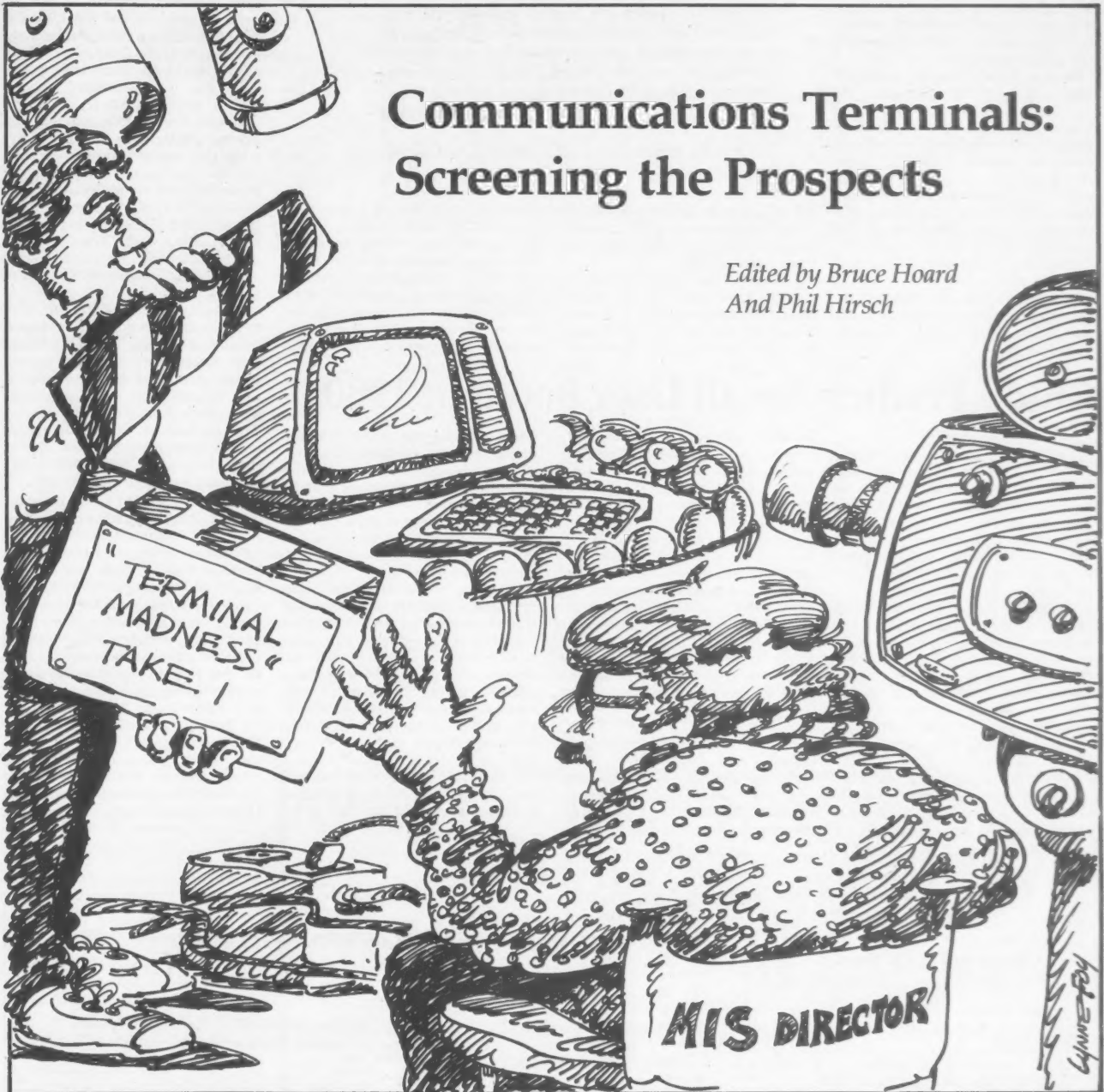
Cook holds a B.S. from Indiana University of Pennsylvania and an M.S. from George Washington University.

October 26, 1981

SPECIAL REPORT

Communications Terminals: Screening the Prospects

*Edited by Bruce Hoard
And Phil Hirsch*



Questions to Ask When Buying All Computer Terminals Not Created Equal

By Gordon Hope
Special to CW

Despite the proliferation within DP of standards and universal interfaces, and despite the fact that terminals are pretty much "commodity items," buying a terminal is still a procedure fraught with pitfalls.

Do you believe that all computer terminals are pretty much alike? Do you think the state of the art in electronics design makes them all fairly equal in reliability, and that any two terminals labeled "RS-232C asynchronous" will be compatible with each other and operate the same when connected to your mainframe computer? If you think so, you're wrong.

These are, in fact, fairly common misconceptions.

This problem is compounded by the large number of terminals available from a large number of manufacturers.

Fortunately, there are several well-defined steps buyers can take to assure they are getting the best value

to weather changes in the economic climate that affects all businesses. A larger vendor, with a good history in

ing vendors and their products. Buyers would do well to consult these services.

2. Is the terminal comfortable to use? Is it well-designed so that the terminal operator can use it all day long and still feel comfortable? Is the screen free of glare and easy to read?

Is the keyboard comfortable to use? How does it feel? Anyone who has used a keyboard knows that some feel very comfortable, whereas others feel instantly foreign or hostile.

The best way of investigating characteristics is to have a terminal operator actually sit at the device and use it — for 15 to 30 minutes at a minimum — and, if possible, for a day. A keyboard that feels "wrong" or uncomfortable will not be used or it will produce a higher rate of missed strokes.

The best way of checking this out is to use it under conditions as close as possible to actual use. This means with similar furniture to the intended use, under similar lighting and so on. Buyers who have narrowed down their choices to perhaps two or three should try to do side-by-side comparisons. If the purchase is to be made through a distributor, terminals may be set up side-by-side.

Another important aspect of evaluating a terminal is whether the keyboard is detachable. The advantage of such an arrangement is that the terminal and keyboard can be positioned to assure operator comfort.

However, detachable keyboards are not for every installation. Some organizations experience a high rate of theft or vandalism. In some cases, thieves literally cut the cable between the keyboard and terminal and walk off with it.

3. Will the terminal work with existing applications? Will it communicate with my application or mainframe without software changes? Terminals with seemingly identical specifications on paper may behave

(Continued on SR/6)

'Fortunately, there are several well-defined steps buyers can take to assure they are getting the best value for their money and terminals that will perform their applications well. Buyers who ask the following questions will be much better prepared and will be able to make the most intelligent choices for their organizations.'

What is the reputation of the vendor? How long has the vendor been in business?'

for their money. Buyers who ask the following questions will be able to make the most intelligent choices for their organizations:

1. What is the reputation of the vendor? How long has the vendor been in business and what is its reputation? Obviously, a larger vendor has more stability and is better able

the industry, is able to devote more resources to good terminal design and manufacture. A large population of unhappy users should be a warning sign to a prospective buyer, just as a happy user population is an excellent indicator of future value and service. Several publishing organizations have prepared reports compar-

Study Predicts Small User Boom in 1980s

Special to CW

BOSTON — The outlook for the computer terminal market between now and 1986 includes changes in both market segments and the channels of distribution, according to "Terminal Distribution Patterns 1981-1986," a study recently published by American Computer Appraisal Service (Acas) here.

Although large users will continue to generate the strongest demand per segment, the greatest growth will be experienced among small users, especially the small- and medium-size business and home/hobby segments. However, significant growth will also be realized in the rest of the market, including the scientific and educational segments.

The changes in end users will be accompanied by corresponding adaptations in distribution channels. Newer channels are gaining in mar-

ket share as a result of end users' increasing demands for service from vendors and distributors, a trend that began a few years ago. The vendor sales force will continue to concentrate on large business customers, while other channels, including systems houses and retail outlets, will serve the faster-growing small- and medium-size business segments.

Both direct mail and Wats lines are expected to have only minimal impact on terminal distribution. At the present time, the largest share of the market belongs to the vendor sales force, followed by distributors.

Changing End-User Demand

The 1979-1980 time frame witnessed a continuing shift in hardware and software capabilities, end user expectations and distribution channels. Before 1975, the primary concern of end users was the deliv-

ery of higher-speed hardware at lower prices from vendors. Thus, the competitive edge sought by vendors and distributors was delivery and a high hardware price/performance ratio. This was true of CPUs, but could also be seen in the advent of a price-competitive, teletype-compatible terminal market.

Although pinpointing the exact date is impossible, it became evident around 1976 that in addition to delivery of faster hardware, end users were increasingly demanding better service and a total systems approach to DP. This meant vendors and distributors would be expected to provide improved software offerings, software support and maintenance policies. Criticism leveled at mini-computer vendors at the time accused them of misunderstanding end-user needs, and the lack of ap-

(Continued on SR/8)

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Display Supplier and Model	No. of User Responses	No. of Displays in Use	Weighted Averages and Response Counts																																		
			Overall Performance					Ease of Operation					Display Clarity					Keyboard Feel and Usability					Hardware Reliability					Maintenance Service					Software and Technical Support				
			WA	E	G	F	P	WA	E	G	F	P	WA	E	G	F	P	WA	E	G	F	P	WA	E	G	F	P	WA	E	G	F	P					
ADOS all models	4	106	3.3	1	3	0	0	3.5	2	2	0	0	3.3	1	3	0	0	2.5	0	2	2	0	3.5	2	2	0	0	3.0	1	2	1	0	3.0	1	2	1	0
Beehive all models	3	55	3.5	1	1	1	0	2.7	1	1	0	1	3.3	1	2	0	0	3.5	1	1	1	0	2.7	1	0	2	0	*	1	0	1	0	1	0	1	0	
Burroughs TD 830	4	180	3.0	0	4	0	0	3.5	2	2	0	0	3.3	2	1	1	0	3.8	3	1	0	0	3.3	1	3	0	0	2.5	1	1	1	1	3.0	1	2	1	0
Burroughs TD 832	3	171	3.0	0	3	0	0	2.7	0	2	1	0	2.7	1	1	0	1	3.0	0	3	0	0	3.0	0	3	0	0	2.7	1	0	2	0	3.0	1	1	1	0
Burroughs others and unspecified Subtotals	11	378	3.0	0	4	0	0	3.0	0	4	0	0	2.5	0	3	1	0	3.3	1	3	0	0	3.3	1	3	0	0	2.5	1	1	1	1	2.5	1	3	0	3
Data General all models	4	158	3.0	1	2	1	0	3.8	3	1	0	0	3.5	2	2	0	0	3.0	1	2	1	0	3.0	1	2	1	0	3.0	2	0	2	0	3.0	2	0	2	0
Datamatic all models	4	117	3.5	2	2	0	0	3.5	2	2	0	0	3.3	1	3	0	0	3.5	2	2	0	0	3.7	2	1	0	0	*	1	1	0	0	*	1	1	0	0
DEC VT 100	6	41	3.8	5	1	0	0	3.5	4	1	1	0	3.7	4	2	0	0	3.7	4	2	0	0	3.7	4	2	0	0	2.8	3	1	1	0	3.5	3	3	0	0
Four Phase all models	5	234	3.2	1	4	0	0	3.0	0	5	0	0	2.4	0	2	3	0	2.8	1	4	1	0	2.8	1	2	2	0	2.8	4	1	0	1	2.8	1	3	1	0
Harris all models	6	178	3.0	1	4	1	0	3.5	3	3	0	0	3.0	1	4	1	0	2.8	1	3	2	0	3.0	0	6	0	0	3.2	1	5	0	0	3.3	2	4	0	0
Hazeltine all models	3	816	2.3	0	1	2	0	2.7	0	2	1	0	2.7	0	2	1	0	2.3	0	1	2	0	2.3	0	1	2	0	1.7	0	0	2	1	*	0	3	0	2
Heath Zenith all models	3	3	3.3	1	2	0	0	3.0	1	1	1	0	3.0	1	1	1	0	2.7	1	1	1	0	3.7	2	1	0	0	3.7	2	1	0	0	3.7	2	1	0	0
Hewlett Packard 2621	8	204	4.0	8	0	0	0	3.6	6	1	1	0	3.9	7	1	0	0	4.0	7	0	0	0	3.6	5	3	0	0	3.6	5	1	1	0	3.4	4	2	1	0
Hewlett Packard other 2600 series Subtotals	4	38	4.0	4	0	0	0	4.0	4	0	0	0	4.0	4	0	0	0	3.8	3	1	0	0	4.0	4	0	0	0	4.0	4	0	0	0	4.0	3	0	0	0
Honeywell VIP Series	4	171	3.2	2	1	1	0	3.0	1	1	1	0	2.5	0	2	2	0	2.8	0	3	1	0	3.0	1	2	1	0	3.5	2	1	0	0	2.5	0	2	2	0
IBM 3101	3	515	3.0	0	3	0	0	2.7	0	2	1	0	3.7	2	1	0	0	3.0	1	1	1	0	3.3	1	2	0	0	*	1	0	0	0	*	0	0	2	0
IBM 3274	3	440	3.3	1	2	0	0	3.3	1	2	0	0	3.3	1	2	0	0	3.0	1	1	0	0	3.3	1	2	0	0	3.0	1	1	0	0	3.0	1	1	1	0
IBM 3276	6	554	3.7	4	2	0	0	3.3	4	3	0	0	3.3	2	4	0	0	2.8	2	1	3	0	3.3	4	2	0	0	3.3	2	1	3	0	3.3	2	2	2	0
IBM 3277	7	425	3.4	3	4	0	0	3.6	4	3	0	0	3.3	2	5	0	0	3.4	3	4	0	0	3.3	2	5	0	0	3.3	2	5	0	0	3.3	2	5	0	0
IBM 3278	21	2842	3.7	15	6	0	0	3.3	7	14	0	0	3.2	14	6	0	0	3.3	8	9	4	0	3.3	8	9	4	0	3.3	8	9	4	0	3.3	8	9	4	0
IBM 3279	4	324	4.0	4	0	0	0	3.5	2	2	0	0	3.5	2	2	0	0	3.3	1	3	0	0	3.8	3	1	0	0	3.5	2	2	0	0	3.5	2	2	0	0
IBM 3270 other & unspecified IBM others & unspecified Subtotals	6	851	3.2	1	5	0	0	3.2	1	5	0	0	3.0	1	4	1	0	3.3	2	4	0	0	3.2	1	5	0	0	3.2	1	5	0	0	3.2	1	5	0	0
IBM others & unspecified Subtotals	55	6005	3.6	3	2	0	0	3.4	2	3	0	0	3.2	1	4	0	0	3.0	1	3	1	0	2.8	0	4	1	0	2.4	0	3	1	1	2.0	0	2	1	2
ITT Courier 270 2700 2750	6	407	3.2	1	5	0	0	3.3	2	4	0	0	3.3	2	4	0	0	3.5	3	3	0	0	2.8	1	3	2	0	3.2	1	4	0	0	2.8	1	2	2	0
ITT Courier others and unspecified Subtotals	12	139	3.2	1	5	0	0	3.3	2	4	0	0	3.3	2	4	0	0	3.2	5	5	0	0	2.7	0	4	2	0	3.0	0	6	0	0	2.5	0	3	3	0
Leas Sugar ADM 3A	6	48	3.3	2	1	0	0	3.5	6	0	0	0	3.0	2	1	0	0	3.3	4	0	0	0	3.3	4	0	0	0	2.8	1	0	0	0	2.8	1	0	0	0
Leas Sugar others and unspecified Subtotals	3	190	3.3	1	2	0	0	3.3	1	2	0	0	3.3	1	2	0	0	2.0	0	3	0	0	2.7	1	1	0	0	2.5	0	1	4	0	2.3	0	1	2	0
MDS Treas all models	3	11	3.0	3	6	0	0	3.6	5	4	0	0	3.1	3	4	0	0	2.9	2	3	0	0	3.1	4	3	1	0	2.6	1	3	5	0	2.7	1	4	4	0
Memorex 1377	3	11	3.0	1	1	1	0	3.0	0	3	0	0	3.3	1	2	0	0	3.0	0	3	0	0	2.7	1	1	0	0	3.0	1	1	1	0	2.7	1	1	0	1
Memorex 1377	6	548	3.3	3	2	1	0	3.5	3	3	0	0	3.0	1	4	1	0	3.2	3	3	0	0	3.2	2	3	1	0	2.8	1	3	2	0	2.5	1	2	2	1
Teletype all models	5	58	3.8	4	1	0	0	3.6	4	0	1	0	4.0	5	0	0	0	3.6	4	0	1	0	3.8	4	1	0	0	3.6	4	0	1	0	3.6	4	0	1	0
Teletype 40 Series	6	63	3.5	3	3	0	0	3.2	1	5	0	0	3.5	3	3	0	0	3.5	3	3	0	0	3.3	3	2	1	0	3.2	3	2	0	1	3.5	3	3	0	0
Telex 270 Series	7	273	3.0	1	5	1	0	3.3	2	5	0	0	3.4	4	2	1	0	3.1	2	4	1	0	2.6	1	2	4	0	3.0	1	5	1	0	3.0	1	5	1	0
Univac UTS 400	5	789	3.2	1	4	0	0	3.2	1	4	0	0	2.8	1	2	1	0	2.8	1	2	2	0	2.8	1	2	2	0	2.2	0	1	4	0	2.0	0	1	3	1
Univac Uniscope models	4	87	2.3	1	1	0	2	2.3	1	1	0	2	2.8	1	1	0	2	2.3	1	1	0	2	2.3	1	1	0	2	2.5	1	0	3	0	2.0	1	0	1	2
Univac Uniscope Subtotals	9	886	2.6	2	5	0	2	2.6	2	5	0	2	2.8	2	4	0	0	2.6	2	3	2	2	2.6	2	3	2	2	2.6	1	1	7	0	2.0	1	0	1	3
All Others	31	424	3.0	7	15	8	0	3.0	6	17	7	0	2.9	7	11	12	1	2.8	8	11	8	3	3.0	9	16	3	3	2.7	5	11	11	2	2.9	7	16	5	2
GRAND TOTALS	208	11,362	3.3	84	104	17	2	3.3	78	112	14	3	3.2	70	104	31	3	3.1	70	93	36	6	3.2	77	97	26	7	3.0	65	80	47	7	2.9	58	81	46	13

LEGEND: Weighted Average (WA) is based on assigning a weight of 4 to each user rating of Excellent (E), 3 to Good (G), 2 to Fair (F), and 1 to Poor (P).
*Weighted Average rated 1 lower than three responses are received.

LEGEND: Weighted Average (WA) is based on assigning a weight of 4 to each user rating of Excellent (E), 3 to Good (G), 2 to Fair (F), and 1 to Poor (P).
*Weighted Average invalid if fewer than three responses are received.

Users' Ratings of Alphanumeric Display Terminals

Datapro Chart

By Bruce Hoard
CW Staff

DELRAN, N.J. — When it comes to alphanumeric display terminals, Datapro Research Corp. found users prefer products from Hewlett-Packard Co. and IBM.

More specifically, the HP 2600 series and IBM 3279 terminals scored perfect "4s" in the weighted average section within the overall performance category. Four corresponds to excellent, 3 to good, 2 to fair and 1 to poor.

The firm based the ratings on 12 users of the HP 2600 with 242 terminals and four 3279 users with 324 devices.

Other Terminals

Other terminal types rated included teleprinter, user-programmable and batch. Respective leaders there were Texas Instruments, Inc., HP and Northern Telecom, Inc.

Ratings for the terminal types appeared in the updates to Datapro Reports on Data Communications during the past year.

The lowest rated alphanumeric display terminals were all Hazeltine Corp. and Sperry Univac Uniscope models, both of which registered 2.3s to the leaders' 4s. Three users representing 816 Hazeltine terminals responded, while four users with 97 terminals rated the Univac Uniscopes.

Turning to teleprinter terminals, the TI Model 765 registered a 3.8 weighted average for overall performance based on four users and five terminals. The Teletype Corp. Model 33 finished on the low end of the

scale with a 3.0 rating based on three users with six terminals.

HP Tops List

HP topped the list again in the user-programmable terminal category, with a repeat 4 for overall performance. The rating was based on the responses of three users with 10 ter-

minals in use. The Computer Devices, Inc. Miniterm 1206 and Four-Phase Systems, Inc. Model IV 90 each registered 3s on the lower end. Three Computer Devices users responded, representing eight terminals. Three users with 57 Four-Phase IV 90s rated their terminals.

Northern Telecom came out on top

in the batch terminal ratings with a 4 on overall performance based on three responses representing four terminals.

Conversely, Harris Corp. 500 series models notched a 3 from five users with five terminals.

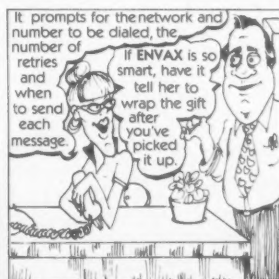
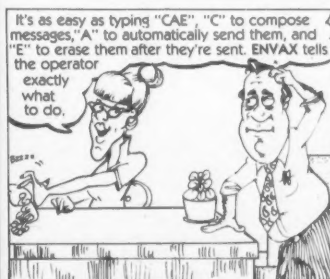
Datapro Research Corp. is located in Delran, N.J. 08075.

More Charts
On Next Page

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Terminal Supplier and Model	No. of User Responses	No. of Terminals in Use	Weighted Averages and Response Counts																																			
			Overall Performance					Ease of Operation					Keyboard Feel and Usability					Print Quality			Noise Level			Hardware Reliability			Maintenance Service											
			WA	E	G	F	P	WA	E	G	F	P	WA	E	G	F	P	WA	E	G	F	P	WA	E	G	F	P	WA	E	G	F	P						
Anderson Jacobson—AJ 832	3	4	37	2	1	0	0	33	1	2	0	0	33	1	2	0	0	30	1	1	1	1	0	27	0	2	1	0	33	1	2	0	0	27	0	2	1	0
Digital Equipment Corporation—LA 35/36 DECwriter II	10	78	34	5	4	1	0	32	4	4	2	0	32	4	4	2	0	26	0	6	4	0	25	1	3	6	0	30	2	6	2	0	30	1	6	1	0	
LA 120	6	104	37	4	2	0	0	33	2	4	0	0	33	3	2	1	0	30	2	3	0	1	23	0	2	4	0	30	2	3	0	1	37	5	2	0	0	
Subtotals	16	182	35	9	6	1	0	33	6	8	2	0	33	7	6	3	0	28	2	9	4	1	24	1	5	10	0	30	4	9	2	1	33	6	8	1	0	
General Electric—Terminet 30	3	3	33	1	2	0	0	27	0	2	1	0	23	1	1	1	0	27	0	2	1	0	30	1	1	1	0	33	1	2	0	0	30	0	3	0	0	
Other models	6	67	33	2	4	0	0	32	1	5	0	0	28	0	3	1	0	25	2	3	1	0	28	1	2	2	0	30	1	4	1	0	27	0	4	2	0	
Subtotals	9	70	33	3	6	0	0	30	1	7	1	0	26	1	4	2	0	30	2	5	2	0	29	2	3	3	0	31	2	6	1	0	28	0	7	2	0	
IBM, all models	6	203	33	3	2	1	0	33	2	4	0	0	30	1	3	1	0	33	3	2	1	0	30	1	4	1	0	35	4	1	1	0	30	3	1	1	1	
Teletype—Model 33	3	6	30	0	3	0	0	30	0	3	0	0	20	0	1	1	1	20	0	0	3	0	10	0	0	0	3	27	1	1	0	1	27	0	2	1	0	
Model 43	9	73	34	4	5	0	0	33	3	6	0	0	34	4	5	0	0	32	3	5	1	0	28	2	3	4	0	37	6	3	0	0	30	4	3	1	0	
Subtotals	12	79	33	4	8	0	0	33	3	9	0	0	31	4	6	1	1	29	3	5	4	0	23	2	3	4	0	34	7	4	0	1	29	4	5	2	0	
Texas Instruments—Model 743, 745	10	217	34	4	6	0	0	30	4	6	0	0	31	2	7	1	0	26	0	6	4	0	31	4	3	3	0	33	4	5	1	0	29	3	5	1	0	
Model 765	4	5	38	3	1	0	0	33	1	3	0	0	35	2	2	0	0	28	0	3	1	0	30	1	2	1	0	38	3	1	0	0	35	2	2	0	0	
Other 700 Series	5	195	30	1	3	1	0	34	2	3	0	0	34	2	3	0	0	26	1	2	1	1	34	2	3	0	0	32	2	2	1	0	28	1	2	2	0	
Model 820	4	13	35	2	2	0	0	38	3	1	0	0	30	0	4	0	0	33	1	3	0	0	30	1	2	1	0	33	1	3	0	0	28	1	1	2	0	
Subtotals	23	430	34	10	12	1	0	34	10	13	0	0	31	6	18	1	0	27	2	14	6	1	31	8	10	5	0	33	10	11	2	0	29	7	10	5	0	
All Others	26	446	32	7	17	2	0	30	4	18	4	0	30	3	16	2	0	26	2	14	7	2	25	3	13	5	5	31	7	15	4	0	30	7	12	4	2	
Grand Totals	95	1414	33	38	52	5	0	32	27	61	7	0	31	23	53	10	1	28	15	50	25	4	27	17	40	29	8	32	35	48	10	2	31	27	45	16		

Datapro Chart

Users' Ratings of Teleprinters

Terminal Supplier and Model	Number of User Responses	Number of Terminals in Use	Weighted Averages and Response Counts																														
			Overall Performance					Ease of Operation					Ease of Programming					Manufacturer's Software					Hardware Reliability					Maintenance Service					
			WA	E	G	F	P	WA	E	G	F	P	WA	E	G	F	P	WA	E	G	F	P	WA	E	G	F	P						
Burroughs TC Series	5	48	3.4	2	3	0	0	4.0	5	0	0	0	2.8	2	0	3	0	2.0	0	0	5	0	2.8	2	0	3	0	1.6	0	0	3	2	
Computer Devices Miniterm 1206	3	8	3.0	0	3	0	0	3.0	0	3	0	0	1	0	1	0	0	0	2	0	0	0	3.0	1	1	1	0	3.0	0	3	0	0	
Datapoint all models	10	127	3.6	6	4	0	0	3.8	8	2	0	0	3.0	2	5	2	0	3.0	0	9	0	0	3.3	4	5	1	0	3.2	3	6	1	0	
Four Phase— IV 50	4	134	3.5	2	2	0	0	3.5	2	2	0	0	0	0	0	1	0	0	0	1	0	3.5	3	0	1	0	2.8	2	0	1	1		
IV 90	3	57	3.0	1	1	1	0	2.0	0	1	1	1	0	1	0	0	1	0	0	1	0	2.7	1	0	2	0	3.0	1	1	1	0		
Others & unspecified	11	190	3.6	7	4	0	0	3.3	4	6	1	0	0	0	1	0	0	0	0	1	0	3.5	6	4	1	0	3.2	4	5	2	0		
Subtotals	18	381	3.5	10	7	1	0	3.1	6	9	2	1	0	2.5	1	1	1	1	2.3	0	2	1	3.3	10	4	4	0	3.1	7	6	4	0	
Hewlett-Packard— 2647	3	10	4.0	3	0	0	0	3.0	0	3	0	0	0	1	1	0	0	0	2	0	0	3.3	1	2	0	0	3.7	2	1	0	0		
Others & unspecified	3	5	3.3	1	2	0	0	3.3	1	2	0	0	0	2.7	1	1	0	1	2.7	0	2	1	3.0	0	3	0	0	3.0	0	3	0	0	
Subtotals	6	15	3.7	4	2	0	0	3.2	1	5	0	0	0	3.0	2	2	0	1	2.8	0	4	1	3.2	1	5	0	0	3.3	2	4	0	0	
IBM all models	8	49	3.1	1	7	0	0	3.1	1	7	0	0	0	2.8	1	4	3	0	3.1	1	7	0	0	3.3	2	6	0	0	3.1	1	7	0	0
Northern Telecom all models	4	357	3.3	1	3	0	0	3.3	1	3	0	0	0	3.0	2	0	2	0	3.7	2	1	0	0	3.3	1	3	0	0	3.3	1	3	0	0
Ontel all models	4	85	3.3	1	3	0	0	3.3	1	3	0	0	0	0	1	1	0	0	0	2	0	0	3.8	3	1	0	0	3.3	2	1	1	0	
Sperry Univac UTS 400	13	302	3.2	4	8	1	0	3.3	5	7	1	0	0	0	1	1	0	0	0	1	1	0	2.9	4	5	3	1	3.0	4	5	4	0	
Texas Instruments all models	4	140	3.3	1	2	0	0	3.3	2	0	1	0	0	2.7	0	2	1	0	2.0	0	0	3	0	3.0	1	2	1	0	2.8	0	3	1	0
All others	12	270	3.4	7	4	0	1	3.4	6	5	1	0	0	3.3	3	4	1	0	2.4	0	6	1	2	3.0	5	3	3	1	2.8	2	6	2	1
GRAND TOTALS	87	1782	3.4	37	46	2	1	3.3	36	44	5	1	0	2.9	14	20	16	2	2.7	3	34	12	3	3.2	34	35	16	2	3.0	22	44	16	0

Datapro Chart

Users' Ratings of User-Programmable Terminals

Manufacturer & Model	No. of User Re- sponses	No. of Units	Weighted Averages and Response Counts*																								
			Overall Performance				Ease of Operation				Hardware Reliability				Maintenance Service				Terminal Software				Technical Support				
			WA	E	G	F	P	WA	E	G	F	P	WA	E	G	F	P	WA	E	G	F	P	WA	E	G	F	P
Harris—																											
500 Series	5	5	3.0	1	3	1	0	2.8	0	4	1	0	2.4	0	3	1	1	2.6	0	3	2	0	2.6	0	3	2	0
1600 Series	6	11	3.2	2	3	1	0	3.2	3	2	0	1	3.0	2	2	2	0	2.3	0	3	2	1	3.2	1	5	0	
Subtotals	11	16	3.1	3	6	2	0	3.0	3	6	1	1	2.7	2	5	3	1	2.5	0	6	4	1	2.9	1	8	2	
IBM—																											
3776	14	47	3.3	4	10	0	0	2.9	3	7	4	0	3.4	7	6	1	0	3.1	5	7	1	1	3.2	3	9	1	
3777	14	42	3.6	9	5	0	0	3.3	5	8	1	0	3.3	4	10	0	0	3.4	5	9	0	0	3.3	3	9	0	
3780	3	29	3.3	1	2	0	0	3.3	1	2	0	0	2.7	0	2	1	0	2.7	0	2	1	0	3.0	0	3	0	
Subtotals	31	118	3.5	14	17	0	0	3.1	9	17	5	0	3.3	11	18	2	0	3.2	10	18	2	1	3.2	6	21	1	
Northern Telecom (formerly Data 100)—																											
74	4	20	3.5	2	2	0	0	3.5	2	2	0	0	2.8	0	3	1	0	2.8	0	3	1	0	3.3	1	3	0	
76	8	32	3.4	4	3	1	0	3.4	3	5	0	0	3.1	3	3	2	0	2.9	3	1	4	0	3.1	2	4	1	
77	4	8	3.3	1	3	0	0	3.3	1	3	0	0	2.8	1	1	2	0	2.8	0	3	1	0	3.5	2	2	0	
78	3	4	4.0	3	0	0	0	4.0	3	0	0	0	3.3	1	2	0	0	3.0	1	1	1	0	3.3	1	2	0	
Others & unspecified	7	47	3.0	1	5	1	0	2.9	1	4	2	0	2.9	1	4	2	0	2.6	0	4	3	0	3.0	1	5	1	
Subtotals	26	111	3.3	11	13	2	0	3.3	10	14	2	0	3.0	6	13	7	0	2.8	4	12	10	0	3.2	7	16	2	
Unitech, all models	4	6	3.3	1	3	0	0	3.0	0	4	0	0	2.8	1	2	0	1	2.8	1	2	0	1	3.3	1	3	0	
All others	4	22	3.5	2	2	0	0	3.0	2	1	0	1	3.5	2	2	0	0	3.3	1	3	0	0	2.3	0	1	3	
GRAND TOTALS	76	273	3.4	31	41	4	0	3.2	24	42	8	2	3.1	22	40	12	2	2.9	16	41	16	3	3.1	15	49	8	

Consider Swedish Experience

User Comfort, Safety Now Major Issues in U.S.

By E. Roger Hotte
Special to CW

In the past, American workers gained much job satisfaction from their familiarity and interaction with other workers. Today, because of technological advances, workers are increasingly interfacing with more machines and fewer people. In the future, almost every worker will be using keyboards and CRT terminals to perform many more of his job functions.

With the introduction of keyboards and CRT terminals into every facet of working life, it is imperative of electronic equipment to consider user interplay with such equipment.

Obviously, this issue of user comfort and safety is more critical in the U.S. than was originally believed. As reported in *Computerworld* [Feb. 16], more than 1,000 employees at a major company in California struck over health and safety improvements.

Regulations governing working conditions for computer-related environments are now pending in the state of Maine (Legislative Document 1049). No doubt the National Institute for Occupational Safety and Health (NIOSH) will monitor trends on this kind of legislation very carefully.

Where can American employers turn to find the prototype for this beneficial, comfortable and safe work environment — prime factors in worker satisfaction?

There exists a positive Swedish experience that has been copied widely and successfully throughout Europe. In 1976, Skandia, a large Swedish insurance company, carried out a survey among computer operators to determine work environment dissatisfaction. Concomitantly they obtained basic information for the design of a superior work environment.

The results of the survey highlighted areas causing personal dissatisfaction with electronic machines and machine environment. These areas included, among others, factors affecting vision comfort, safety and effectiveness, machine design, work station design and reactions to sound and noise.

Ergonomics Defined

The analysis of this interplay is called ergonomics, which comes from the Greek words *ergon* (work) and *nemein* (divide). Ergonomics is the science of adaptation of implements, tools and the work environment to man's strengths, capabilities and limitations. Basic findings and applications follow.

A computer terminal system is often installed in premises that were previously used for other types of office work. Therefore, large windows, light coming from the left of the work place, white or light walls and normal ceiling lighting are very common characteristics.

Such factors create a less than ideal environment for working with ter-

minal screens. Operators will see mirror images and reflections from window, lights and screens. Secondly, there is poor contrast on the screens and the illumination from ceiling lights is often directly dazzling.

In application, the ideal situation is one in which each workstation is provided with adjustable lighting so that each operator can choose the intensity and direction of illumination to suit his needs. For example, older people should be provided with more light than younger people. A

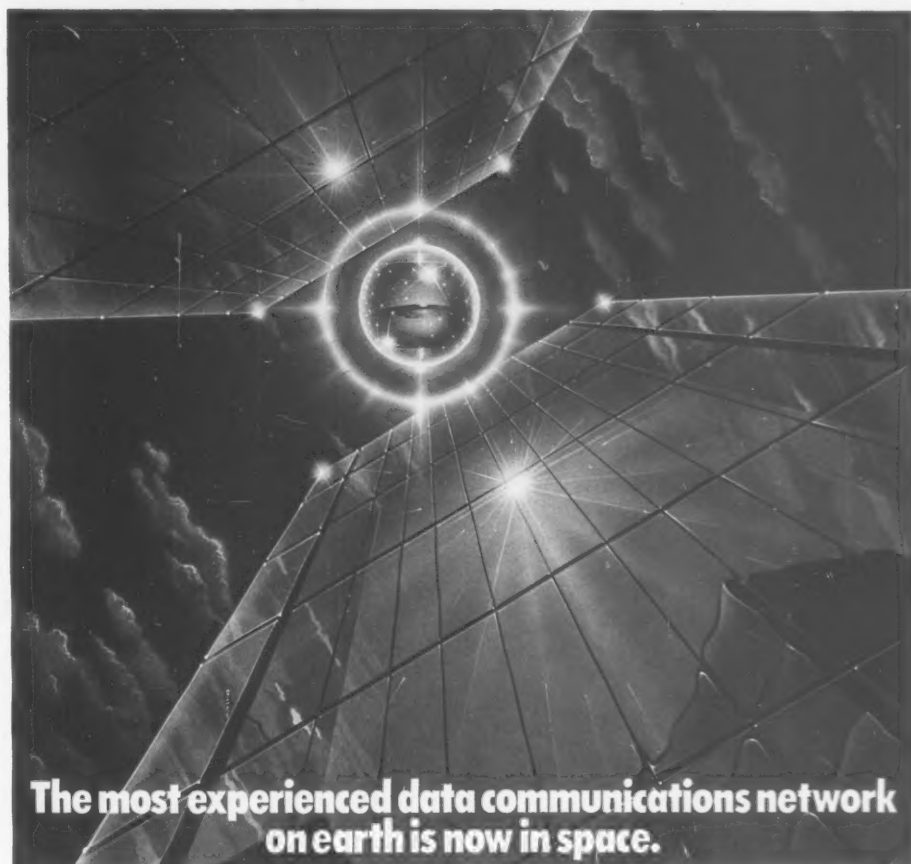
40-year-old needs twice as much light as a 20-year-old, and a person of 60 needs five or six times as much light to see as well.

The eye also needs well-balanced lighting contrast conditions if it is not to tire. Therefore, the luminance of the table surface is important. Studies show that the luminance should be 3:1, which corresponds to white paper on a light brown table. The same luminance ratio applies to the table and terminal equipment and the surface of the surrounding walls.

It has been known medically for years that if the eyes work intensively, focusing on too large a field of vision, the eye muscles become tired. This principle applies to computer technology in that a user's field of vision should be limited both vertically and horizontally.

In other words, a terminal screen should not be too far above the console and papers. The same principle applies laterally so that the distance between the papers and the screen should not be too large. Since the

(Continued on SR/12)



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All DP Terminals Not Created Equal

(Continued from SR/2)

differently in use. There may, for example, be some difference in the code structure of information transmitted. Users should not assume that similar performance terminals are compatible with existing applications. (Every CRT vendor has experienced calls from naive users who

'However, it may not always be possible to obtain references. For competitive reasons, some distributors will be reluctant to supply a long list of names. This does not necessarily mean there are no happy customers — it is simply a fairly common brand of caution. Depending on the size of the order, some distributors will be more amenable to providing references.'

are unaware of this point!) Most vendors will provide

this information, but it should not fall into that famous DP category, the default.

4. Is there an upward growth path with the CRT terminal vendor? It is not uncommon to find CRT terminal users upgrading as their applications evolve and grow. Often, an application might call for a buffered ter-

terminal where formerly a dumb terminal was used. A user might wish to upgrade from a buffered terminal to a user programmable terminal. Having to switch vendors could cause unnecessary disruption of an application.

5. What are the mean-time-between failure (MTBF) and mean-time-to-repair (MTTR) figures? Sometimes, this information can be difficult to obtain, as it is often regarded as proprietary. In past years, 7,000 hours was a fairly standard figure for MTBF. That is swiftly changing. For example, Adds now reports MTBF of 23,000 hours for its Viewpoint CRT. One clue is the kind of technology used in the terminal and the number of components and boards. Generally speaking, the fewer the number of discrete items, boards and connections, the higher the MTBF.

6. Can the vendor provide references? "Ask the man who owns one," goes a popular advertising slogan. The same holds true of terminals.

However, it may not always be possible to obtain references. For competitive reasons, some distributors will be reluctant to supply a long list of names. This does not necessarily mean there are no happy customers — it is simply a fairly common brand of caution. Depending on the size of the potential order, some distributors will be more amenable to providing references.

Some information can be gleaned by learning the number of reputable distributors who carry a manufacturer's product line. As good businessmen, reputable distributors have a natural desire to carry those products that move well and have good customer acceptance, including low failure rates.

7. What are the warranties and maintenance provisions? Warranties are generally valid for 90 days or more depending on the vendor and maintenance may be bundled or unbundled.

Maintenance

Generally speaking, maintenance contracts for dumb terminals cost about \$20 to \$25 per CRT terminal and in most cases there is also third-party maintenance organization available. There are few clear guidelines in this area, so each user should make a personal decision.

After evaluating the above items, price and performance will be the final criteria for deciding on a vendor.

Hope is manager of standard display products for Applied Digital Data Systems, Inc. of Hauppage, N.Y.

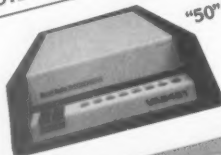


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Study Predicts Small Users Will Create Boom

(Continued from SR/2)
plication software packages presented an opportunity for turnkey vendors to become more successful.

Earlier emphasis on sales to OEMs and larger end users reduced support personnel requirements and provided

low-risk profits to the vendors. However, this strategy came to be seen as limiting the potential market as the reduced cost of computing helped make smaller customers become a major segment of the DP market.

The new emphasis on sup-

port began to present a significant challenge to the vendor's direct sales force. The decreasing size of orders was generating less revenue per sales call. This, along with rising service demands, which are labor intensive and therefore vulnerable to inflation, was increasing the cost of selling beyond acceptable limits.

Consequently, new distribution channels became necessary to provide these services to the end user at a reduced cost to the vendor. In all instances these channels were intended to provide the amount of increased service required to remain competitive. This is especially apparent in the small- and medium business segments, which are growing at an impressive rate.

Distribution Trends

It is estimated that computer terminal deliveries will nearly double by 1986. Acas has identified the primary market segments for terminal deliveries as the following: the business/professional market, the home/hobby market, government, the scientific market and the educational market.

In this study, Acas has identified the following distribution channels for terminals: the vendor sales force or

that sales force under the direct control and compensation of the manufacturer; the systems house, which includes previously differentiated channels such as OEMs and service firms who now offer software and support in addition to hardware; distributors, often referred to as resellers; retail outlets, including vendor stores, independent computer stores, department stores and office product dealers and direct mail and Wats lines.

'In its study, Acas has identified the following distribution channels for terminals: the vendor sales force, or that sales force under the direct control and compensation of the manufacturer; the systems house, which includes previously differentiated channels such as OEMs and service firms who now offer software and support in addition to hardware; distributors, often referred to as resellers; retail outlets, including vendor stores, independent computer stores, department stores and office product dealers and direct mail and Wats lines.'

offer software and support in addition to hardware; distributors, often referred to as resellers; retail outlets, including vendor stores, independent computer stores, department stores and office product dealers and direct mail and Wats lines.

Currently, the vendor sales force has the largest share of the terminal market. Slightly more than half that share is delivered to large businesses, with some concentration on the scientific market as well. By 1986, the value of vendor sales force terminal deliveries is expected to have risen by more than 40% and will

reflect an increased concentration on large businesses.

This is due to the increased cost of selling and maintenance that will be incurred by vendors and is in contrast to the lowering cost of hard-

ware due to improvements in technology. Some advances in remote maintenance are expected to occur in the next five years.

Systems houses are expected to more than double their share of the terminal market by 1986. An opportunity will be created for them as vendors attempt to reduce their costs of selling by concentrating on deliveries to large users.

A major share of the market is currently held by distributors, whose main customers are large businesses that require faster service than the vendor can provide. However, with the vendor sales force securing more of the large business market and with systems houses capturing more small and medium users, distributors will realize a relatively slow growth rate and their overall market share will decline slightly by 1986.

In the retail area, vendor retail stores, department stores and office product dealers have experienced deliveries of very little significance in terms of the overall terminal market. Vendor stores will almost quadruple their deliveries by 1986. Although several manufacturers have experimented in the market, none have made the financial commitment required to make vendor stores a major factor in the total terminal market or in the retail channel.

In comparison, the independent computer store has established itself as an efficient means of distribution to small business users. They are expected to realize considerable success during the next five years, more than doubling their market share by 1986.

Direct mail/Wats line distribution is seen by Acas as suitable only for relatively sophisticated users purchas-

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ing simpler devices featuring diagnostic and/or modular capabilities. Although the dollar volume of this distribution channel will increase by more than a third, its overall market share will total less than 1%.

Summary

If one factor bears most of the responsibility for the changes in terminal distribution patterns, it is the end user's increasing demand for service. This explains in part the growth of systems houses, since they have traditionally provided service. In fact, by 1986, systems houses are expected to have caught up with vendors in terms of total market share. Also, systems houses are in a better economic position

than vendors to provide software and services to the smaller user, a fast-growing segment.

The rapid growth of the small business customer also reflects the rising demand for service, since many small businesses are first-time users and usually cannot support in-house software and

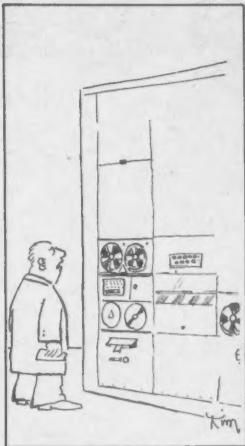
service functions. Therefore, they require more support than more knowledgeable customers. In turn, the growth of the small business user fosters the success of the retail distribution channel, since smaller users do not require large volume shipments and retailers are able to provide smaller quantities

quickly.

Manufacturers and sellers will benefit by observation of current trends in distribution and end-user demands as long as they have the capability to alter their marketing strategies accordingly. Vendors may find it useful to take advantage of distributors, systems houses and in-

dependent retail stores. By establishing some form of cooperative marketing and distribution, vendors may sell more economically to the small user and cope with the new role of service in the computer terminal market.

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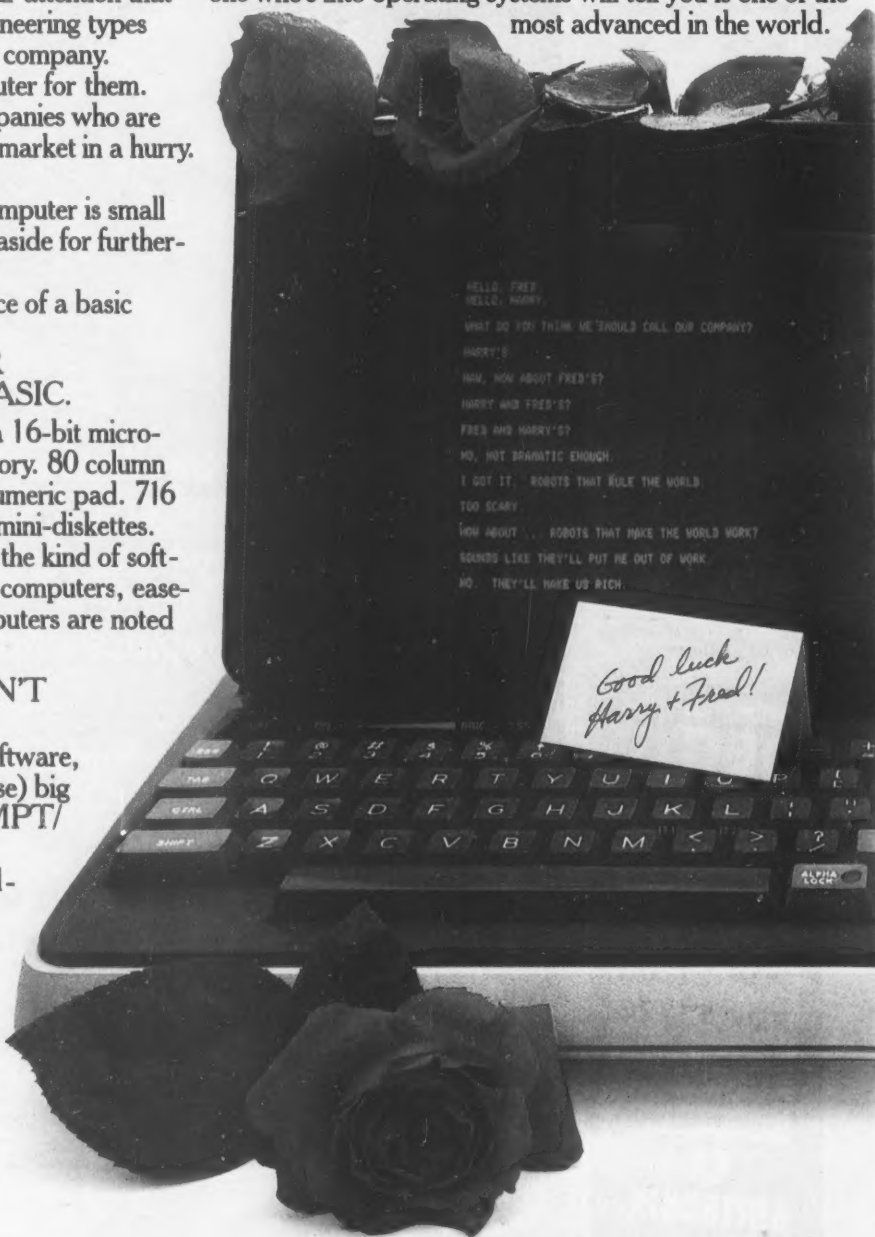
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User Comfort, Safety Now Critical Issues

(Continued from SR/5)

field of vision changes with different types of terminal work, each workstation should be studied individually.

In addition to eye strain, incorrect placement of the viewing screen can cause neck muscle strain. In fact, in order to ensure the best conditions for physical comfort of the eyes and body, the terminal screen should meet three main requirements: individual adjustability, clarity of text and freedom from reflections.

Incidentally, good vision in itself is a necessity for computer work comfort. It has been found, for example,

that bifocal glasses are unsuitable for work with computer display terminals as the screen is at a distance about halfway between the ideal definition of the eyeglasses. Operators who wear normal bifocals are forced to adopt positions that are entirely incorrect.

The chair has a central function in a workstation as it permits a correct sitting position. The seat and the backrest should provide a tension-free and restful position and permit freedom in the sitting position. It should also be designed for quick and easy height adjustment, especially if several operators share the same terminal.

nal.

The working surface must also be organized so that it suits the individual and the tasks being done. Units should be positioned on the basis of the reach of the operator once the chair and table heights have been correctly adjusted. All the frequently used units should be placed in an area that can easily be reached by the arm so that the elbow can remain close to the body.

The secondary area is that which can be reached by the operator stretching out his arms, while a third area is that reached by the operator leaning forward. The last two areas

should be used for units that are not used frequently, thus giving the muscles time to recover and the movement can be regarded as a natural element in dynamic sitting.

Designing Workstations

The position and movements of the hands and fingers are of great importance in the design of workstations. It is through the fingertips that the operator has contact with the computer. The console must be capable of individual adjustment, so the fingers and hands can move quickly.

Often the work project is an error list or file. The text on the screen is more active and the data input is often alphanumerically oriented. For the most part the operator sits with his hands in the typewriting position and with the console directly in front of him. Even so, flexibility is still important to retain the ability to change the positions of the units from one function to another.

The console with a standard typewriter keyboard layout requires the shortest learning time. If the functional keys are a different color they are more easily identified, which in turn means fewer mistakes. The keys should be at least as big as a fingernail, while the layout of the console should be compact so as to reduce hand movements. It has been reported that if the keys are slightly concave they feel good, even at different angles.

The console should not be too steeply inclined as this means that the most distant row of keys can be reached comfortably and that only a slight turn of the wrist is needed to reach the nearest row of keys.

Studies show that people find it difficult to work in a completely silent room. The basic construction of the equipment should be such that it can be used in a normal office environment. The noise level must be kept within acceptable limits. The layout of the room, the ceiling, curtains, placing of partitions and many other factors all affect the spread and distribution of noise.

However, with modern terminals there is no need for all the operators to sit together in the same place. Flexibility and simple cable connectors make more individual arrangements possible. This helps to reduce noise.

The design of the Ericsson Group's equipment is based on this ergonomic approach so that the interplay among people, machines and environments is preserved.

It is commonly claimed that people are adaptable. Indeed, they are, but the human body and the senses constitute an extremely complicated mechanism, which in actual fact possesses a limited ability to withstand stress.

Furthermore, people differ, mentally and physically. Therefore, the machines and the environment must be adapted to the greatest possible extent to the people, not the other way around.

Hotte is vice-president of Datasab Systems, Inc., a partner in The Ericsson Group, Elmsford, N.Y.

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INDIANA HARBOR, Ind. — At Inland Steel Co. here, paper work orders have been replaced by electronic work orders displayed on IBM 3270-type CRT terminals.

At any point in steel coil's production cycle, a worker in Inland Steel's mill can access a huge data base where the coil's up-to-date work order is kept.

The 8180 display stations manufactured by Harris Corp.'s Data Communications Division are scattered throughout the steel mill and handle as many as 60,000 to 90,000 transactions daily. Some display stations function 24 hours a day, seven days a week.

The 8180 interactive terminals, all 233 of them, communicate in IBM's 3270 mode with two IBM 370/168s and a 3032 in the Indiana Harbor computer center. In their process control applications, the Harris terminals allow Inland to shorten the lead time needed to produce a coil of steel and to rush through badly needed orders.

Looking at Production

Inland developed its process control system by breaking the production process into its most fundamental parts.

"We found that as steel is manufactured through the plant, there are a number of serial operations that go on," Bill Sanders, manager of manufacturing systems at Inland, said.

"In any one department there may be eight, 10 or 12 sequential steps. At each one of those steps, somebody would record what went on and maybe eight hours later that information would go up to the planners and schedulers in the form of paper reports.

"In our analysis we found that the recording accuracy of each of those steps was poor. What we had was information coming back to the people who were trying to prepare work instructions for the next operation, but the information was neither timely nor accurate. We ended up with the people on the production floor doing the planning instead of the people who were supposed to be doing the planning."

With accuracy and timeliness as goals, Inland's DP staff developed an integrated production control system that is accessed by the 8180s. The accuracy of the data in the system has improved greatly over the days of pa-

per work orders, until it has reached the 99% level.

The timeliness of work orders has been reduced to a matter of seconds — as long as it takes someone to bring up the work order on the display station's screen and update the information. With

timely and accurate information, Inland is able to control its production process.

"Schedules must be met. Normal production lead-times are not always sufficient. You've got to move the steel through fast," said Don Cade, general supervisor for

production control at Inland Steel's No. 3 Cold Mill, where about 35% of the company's outbound shipments occur.

Cade pointed out that paper copies of production orders are almost nonexistent in No. 3 Cold Mill. And the in-

spectors and workers are not unhappy to see the paperwork disappear.

"We used to have around 50 different people with copies of orders and you had to just hope your copy was up to date," Cade said. "Now,"

(Continued on SR/22)

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POS Terminals Give Small Stores the Business

Special to CW
JACKSON, Miss. — Although the penny candy and fresh popcorn are gone, small town variety stores live on — only now the old cigar box for handling cash is being point-of-sale (POS) terminals.

In towns so small they often never appear on road-

maps from Mississippi to Illinois, W.E. Walker Stores, Inc. provides a thriving variation of the discount general store.

To further simplify purchases from the 6,000 items in stock, Walker's "Bill's" stores recently began installing IBM POS terminals.

These days computers are commonplace in the front of-

fices of businesses, but Walker has taken that one step further and also put technology out in the field.

At two major warehouses, price tags are printed by computer-driven ink jet printers and in the stores prices are read by scanners and purchases are totaled on IBM 3680 point-of-sale ter-

minals.

And none of the old-timers around town even stopped their checkers games to pooh-poo the newfangled equipment. "The response from both customers and employees has been wonderful," said Harry Hughes, vice-president for data processing at the headquarters

here. "They just realize how much easier and faster it is to shop now."

Fast Feedback

As customers and employees enjoy the convenience of the terminals, Walker is benefiting from knowing right away for the first time in its 61-year history just what is selling and how fast.

As a small-town operation (with big-time revenues — \$111 million last year and 382 stores spread across 11 states), Walker previously relied almost totally on gut feeling and word of mouth when stocking merchandise.

'Rain or Shine'

"Come rain or shine, we replenished our basic merchandise every two weeks, because it had usually run out. But we didn't know how fast it ran out and how much extra each store should get," Hughes said. "And we never knew how well the special [one-time sales] merchandise was selling. Now we'll know the sale and stock position of each item immediately. We want to let our buyers know quickly via computer inquiry which items are fast and slow sellers."

"We'll feel that our commitment to point-of-sale terminals was worthwhile if we substantially improve inventory turnaround while steadily increasing sales and reducing markdowns," Hughes said.

"If we guessed well in stocking stores in years past, just imagine our potential now with this computer data."

Change Effective

So far, change has actually worked in favor of the acceptance of the new technology, Hughes said. Relying on repeat, volume business, Walker locates stores only in small, isolated towns (with average populations of around 3,000). Usually the only variety store in a neighborhood, "Bill's," with no advertising, develops a rapport with townspeople, according to Hughes. The store is so successful that locals know when the weekly truckloads of goods are due and often rush to pore over new arrivals.

"People seem to sense that installing the point-of-sale devices is our way of keeping up and that we're making a commitment to their communities," Hughes said. "This should forever eliminate any doubts about computers being able to gain acceptance in small towns and small stores."

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Difference Between PVC, SVC? A User's Guide to Public Packet-Switching

By Al Castro
Special to CW

One of the overall goals of public packet-switched networks is to allow communication between diverse terminals and computers.

Message data to be transmitted between two users at the extremities of a packet-switched communications path is subdivided into fixed-length segments called "packets." The length of these packets is determined by the network and has no relationship to actual message size. Addressing and control information is appended to the packets and they are routed through the network to their destinations. At each destination, the receiving process strips the control information off the packets and reassembles the message for presentation to the end user.

Because each packet contains routing and control information, it is not necessary to establish a permanent physical circuit for each connection. Instead, physical transmission facilities are dynamically allocated only when a packet is actually being transmitted. The result is a logical or "virtual" circuit that utilizes separate physical facilities at different instances in time.

In some respects, packet switching is a form of store-and-forward message switching, since packets are usually stored temporarily at the network entry node before being forwarded to their destination or destinations. The network typically accepts responsibility for delivering each packet and reassembling, at the destination end of the message path, those packets comprising the same message.

There are two types of virtual circuits:

- A permanent virtual circuit (PVC) is one in which there exists a fixed relationship between the sending and receiving processes. All messages originating at the sending process are intended for the same receiving process.
- A switched virtual circuit (SVC) is one in which the sending process specifies the destination for each communications session. The receiving process must give the sending process permission to transmit before any data can be transferred. This procedure is referred to as "call establishment" or "call connection."

"The impact of the IBM announcement will be felt most by manufacturers who previously were providing an SNA-X.25 interface capability. The companies that have addressed this issue as just one facet of their product lines will see some of their competitive edge slip. Those companies that have entered the field solely to meet the need of interfacing SNA to X.25 will have to rethink their marketing strategies."

No change would appear to be necessary for the terminal manufacturer. Those who previously had the ability to interface with SNA still do, and those who previously interfaced with X.25 also still do."

The switched virtual circuit exists only for the duration of the call.

A PVC may be thought of as a dedicated physical line and the switched

virtual circuit as a switched physical line — although it must be remembered that physical resources are allocated in either case only when necessary.

The design of most packet-switched networks assumes that each end point has sufficient intelligence to perform call establishment and clearing as well as the formatting of messages to and from packets. In reality, the terminating points of the network normally are terminals and host computers — the majority of

(Continued on SR/18)



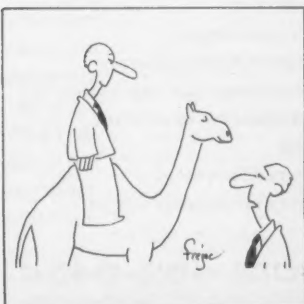
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'Mix-and-Match' Systems A Boon for Credit Unions

By William Friis
Special to CW

Although the nation's 22,000 credit unions now exceed in number the combined total of all commercial banks and savings and loans, these customer-owned banking institutions have, until recently, been somewhat slower than their commercial competitors in adapting on-line computer technology to their branch office operations.

However, three relatively recent computer industry developments are contributing to a rapid change in that situation.

The first of these is the steady decline in minicomputer and other DP hardware prices during the late 1970s. The second is the emergence during the same period of on-line terminal system vendors, like Bunker Ramo Information Systems, that specialized in the development and manufacture of terminals and other devices specifically for the banking and financial industries.

And the third is the development of sophisticated hardware and software capabilities that enable on-line teller terminal printers, electronic journalers, automated teller machines (ATM) and other bank-related devices marketed by these on-line terminal system vendors to be interfaced with almost any communications-oriented mainframe system, be it from IBM, NCR Corp., Hewlett-Packard Co. or others.

'Mix and Match'

This new ability to literally "mix and match" computer equipment to meet the specific desires or requirements of each individual credit union has been the primary factor in the rapid recent growth of these "crossover" or hybrid systems throughout the credit union industry.

The primary objective of utilizing such "crossover" systems is to provide the best possible electronic support for each credit union's branch operations and to maximize the cost/productivity ratios associated with handling everyday customer transactions such as share deposits and withdrawals, loan payments and disbursements and so on, plus such services as issuance of money orders and travelers checks, payment of utility bills and any other customer service provided by the credit union.

Service Bureau

Anacomp, Inc., a computer service company headquartered in Indianapolis, serves more than 500 financial institutions through eight regional DP centers across the country. The company has been steadily expanding its credit union processing capabilities with the result that it currently counts 215 credit unions as its clients. As a consequence, it now ranks among the leaders nationwide in terms of its functions as a service bureau for credit unions.

Anacomp officials say their firm has experienced no difficulty with the

crossover concept. In fact, the company's systems experts are now actively encouraging the process of interfacing one brand of teller window hardware with another maker's host computer through a specially developed software package that can be tailored to each credit union's operational needs.

"The majority of our data centers utilize Burroughs computer mainframe and peripheral hardware," reported Barry Darlege, vice-president of Anacomp's Credit Union Division.

(Continued on SR/32)



On-line terminal systems at the Oakwood/Beech branch of the Dearborn Federal Credit Union help tellers handle voluminous member transactions on a typical payday.



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A User's Guide to Public Packet-Switching

(Continued from SR/15)

which have not been designed to interface with packet-switched networks.

In packet-switching technology, the network nodes that provide the entry and exit points for devices attaching to the network are referred to as data circuit terminating equipment (DCE). Devices interfacing the network are referred to as data terminal equipment (DTE).

A true DTE would be an intelligent device programmed to interface the network and to provide the necessary call establishment, call clearing and packetizing functions. This is re-

ferred to as a packet node DTE. Since few actual devices (terminals or computers) have been developed to perform these functions, additional facilities, called packet assembly/disassembly facilities (Pads) have been developed to allow nonpacket-mode DTEs to interface a packet-switched network. Pads have been developed for asynchronous, bi-synchronous and Systems Network Architecture (SNA) class devices.

In addition to packet assembly/disassembly, these Pads often implement selectable parameters that allow the interface to be tailored to support a particular device. Such is

the case with IBM's recently announced Network Interface Adapter (NIA), the first in a series of program products that will allow SNA users to interface X.25 networks.

IBM has taken a three-phased approach to integration of X.25 into an IBM-controlled environment.

Direct Interface

Release 1 of IBM's X.25 NCP Packet-Switching Interface program product will allow a user of the 3705-11 or 3705-80 communications controller operating under Advanced Communications Function (ACF) NCP/VS software to interface its host CPU di-

rectly to the X.25 network. Also, through the network interface adapter, Release 1 allows SNA devices such as the 8100 to connect directly to an X.25 network.

Release 2 of IBM's new interface will establish the IBM host as an integral part of an X.25 network. This will be accomplished by placing X.25 control functions — such as those for call control (call request, incoming call-connected and call-accepted packets) and those used during data transfer (interrupt, reset and qualified data packets) under host supervision. Release 2 also allows integrated support of a subset of CCITT Recommendation X.29 — (i.e., it permits communication with start/stop and Model 33/35 teletypewriter terminals).

Release 3 will give the 3705 product line the ability to communicate via an X.25 network and still maintain its SNA intermediate node protocols. Release 3 also will include a general purpose DTE/DCE interface, conforming to another CCITT recommendation (X.21), which allows synchronous operation on a public data network.

Impact on Manufacturers

The impact of the IBM announcement will be felt most by manufacturers who previously were providing an SNA-X.25 interface capability. The companies that have addressed this issue as just one facet of their product lines will see some of their competitive edge slip. Those companies that have entered the field solely to meet the need of interfacing SNA to X.25 will have to rethink their marketing strategies.

No change would appear to be necessary for the terminal manufacturer. Those who previously had the ability to interface with SNA still do, and those who previously interfaced with X.25 also still do. Because of the IBM announcement, some terminal manufacturers may decide to create X.25 interfaces in hopes of expanding their potential markets to include the IBM user world.

It would appear from this announcement that IBM has successfully integrated X.25 facilities into its SNA marketing strategy. However, as is the case with all new marketing efforts, the user must take a very pragmatic look at actual capabilities before deciding that the product will satisfy his needs.

Castro is senior staff scientist at Network Analysis Corp.

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*Case Preparation Speeded by 75%***Lawyers Make a Case for DP-Based Research**

Special to CW
STAMFORD, Conn. — Chances are the person sitting behind a computer terminal in General Telephone Corp.'s (GTE) headquarters here is a corporate attorney, not a DP expert. The reason: a new computer-based legal research system has been in use at the company for almost a year.

With the capability of scanning several hundred thousand legal documents in just a few seconds, the computer system is enabling attorneys and researchers to look up legislation and court decisions useful in a GTE telephone rate case about 75% faster than before.

The litigation support system provides instant access to specially compiled legal research data on file in an IBM 3033 processor in GTE's DP center in Camillus, N.Y.

All an attorney needs to do is key a simple search argument into the terminal — usually the name of the issue — and the screen displays a listing of related documents.

The attorney reviews that information and then selects the material that appears to be the most appropriate. Documents that are particularly useful can be printed out in whole or part, depending on the case.

Quick Research

"With this system, an attorney can be reasonably sure that a thorough search has been done," said Richard M. Cahill, assistant general counsel at GTE and one of the people responsible for installing the computer-based research system. "The system makes it possible to do research more quickly than searching through books and publications.

"Additionally, we're able to add decisions to our files which ordinarily are not available in published form for as long as 18 months. "We feel this system is well suited to serve the corporation's attorneys in 14 subsidiary companies. It speeds their research into state and federal regulatory laws relating to communications," Cahill said.

GTE is the parent corporation of more than 60 subsidiaries in 40 states and 20 countries. There are 16 domestic and three international GTE telephone operating companies. The GTE product group has 152 plants throughout the world, manufacturing communications systems, lighting, television and audio equipment, elec-

tronic components and chemicals.

"We didn't want a system that would require additional legal or data processing help," Joseph F. Nash, director of corporate data processing, said. "We wanted a system powerful enough to

handle thousands of documents, and one which could be set up and operated by staff attorneys wherever they are working."

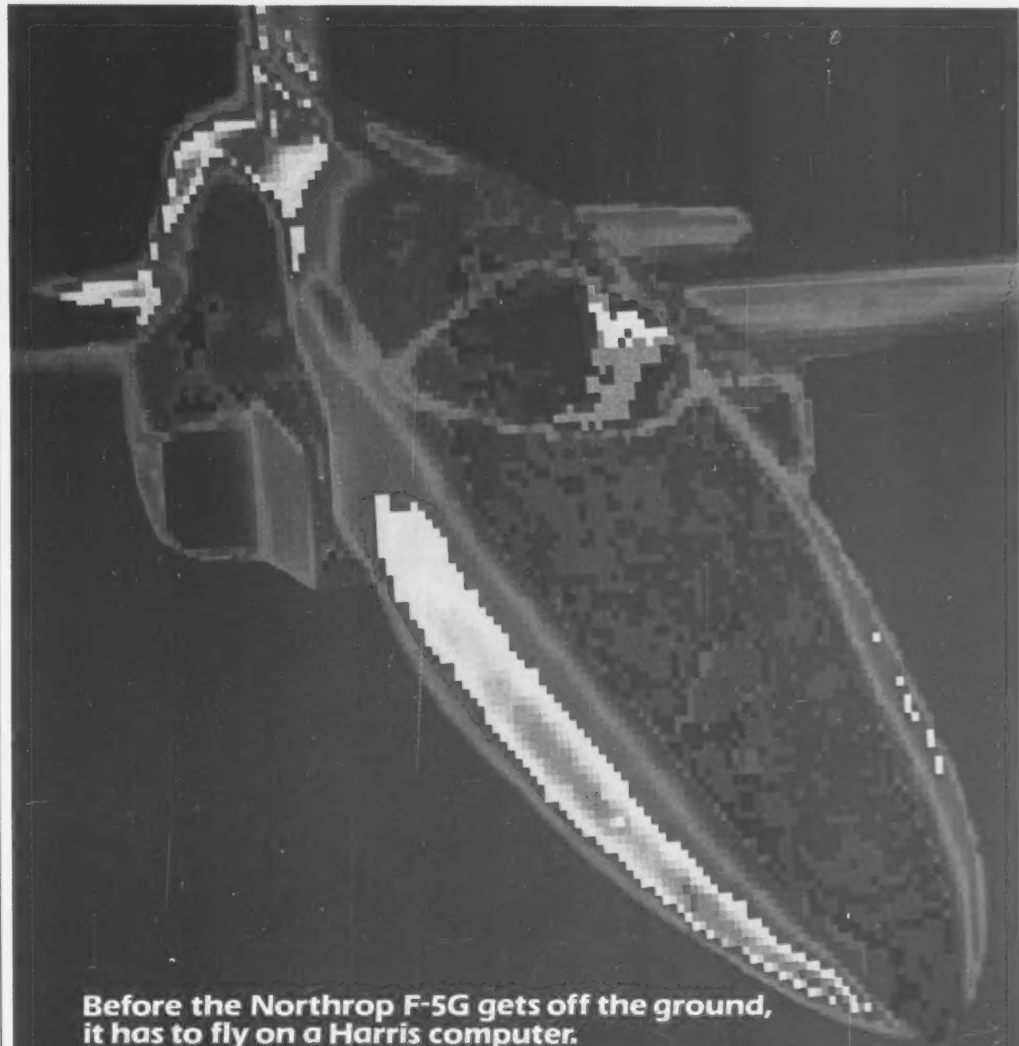
GTE is meeting those objectives with help from two IBM program products: Advanced Text Management

System (ATMS) and the Storage and Information Retrieval System (Stairs). ATMS is used for text entry and editing, permitting the correction, addition and deletion of documents as they are entered into the system. Stairs provides routines that enable

attorneys to search through and retrieve all or portions of documents.

To make the system as easy as possible to use — regardless of the user or the location — GTE developed a handbook of key terms and

(Continued on SR/22)



Before the Northrop F-5G gets off the ground, it has to fly on a Harris computer.

Northrop's high performance F-5 tactical fighters are the most widely deployed fighter aircraft in the free world. A refined version of the F-5, the F-5G "Tigershark," will be delivered in 1983.

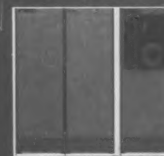
A pair of Harris 800 computers, in concert with twelve other Harris computers, are playing a key role in the development of this aircraft by driving Northrop's two development simulators, as well as being used for interactive

program development.

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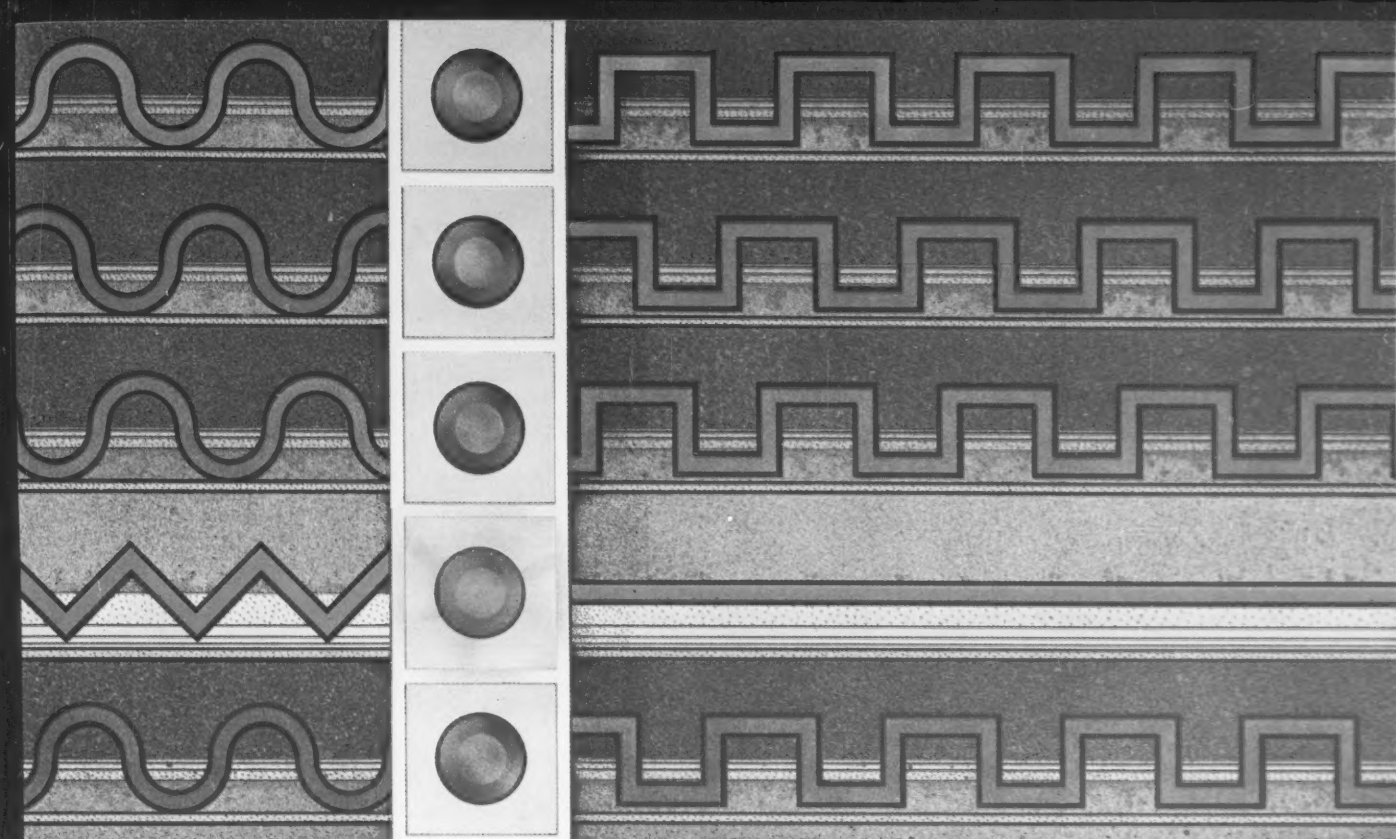


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The knowledge business



Steel Mill Takes the Lead Out of Work Orders

(Continued from SR/13)

there are no handwritten order changes so we don't lose orders. Changes are done on the display terminals so the orders are always up to date. With our computer systems we are able to run a coil of steel through two or three processes in three or four hours. Before we had the CRT terminals on the production floor, it used to take at least a day for each process."

Final Stop

The finishing unit, the final stop in the production cycle for a coil of steel, provides a prime example of

how the computer systems allow Inland to make the most of its production facilities.

There is usually around four hours of inventory waiting to be processed by the finishing unit in No. 3 Cold Mill.

Instead of waiting for written work orders for every coil as it comes to the finishing unit, workers will schedule work through the Harris CRT, which is placed on a stand next to the unit.

"When a coil of steel comes to the finishing unit, the inspector checks on the CRT terminal to see how to finish the coil," Cade explained. "We

can find any and all information we need on any coil through the CRT. If the sales or scheduling department changes something on the work order, we know about it immediately. The employees who use the CRTs find them indispensable."

From management's point of view, an indispensable feature of the 8180 displays is their local format storage (LFS) features. With LFS, the display station is able to store screen formats on diskette or disk at the 8180 system's local controller, Cade continued.

This eliminates the necessity of the mainframe computer transmitting

format and data in response to an inquiry, because with LFS, only data is transmitted from the host over communications lines.

By cutting down on communications line traffic, the responsiveness of the 8180 terminals is improved and communications expenses are reduced.

Future applications of computer systems at Inland Steel have not been precisely defined, but one criterion will always prevail: as in the past, any computer application must assist in producing more steel at a lower cost.

Lawyers Make Case for DP

(Continued from SR/19)

issues to which researchers can refer for quickly accessing needed information. Researchers can use this handbook or their own search terms if they would rather.

Text entry operators, usually legal secretaries, and legal researchers can master the command terminology within a few hours and specialists are not needed to run the system.

This ease of use and setup was demonstrated recently by company attorneys in San Angelo, Texas, who were preparing for a case. By installing terminals linked directly to the 3033 processor in New York they were able to enter thousands of documents into the system — testimony, depositions and memoranda — which they could access and retrieve whenever needed. Since then, lawyers in six telephone company subsidiaries have begun to install terminals at their locations so they too can take advantage of the system.

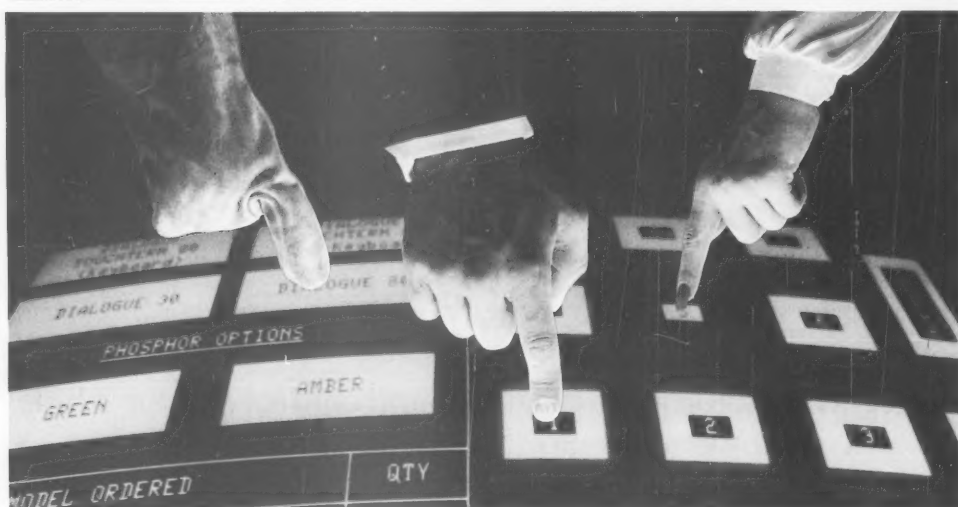
"It's helping us reduce the amount of time it takes to prepare for a rate case hearing," Cahill said. "We can use the information stored in the computer system to reach agreement faster with state and public commissions because our research findings are impressively thorough."

GTE keeps its information files current by subscribing to a legal reporting service in Washington, D.C., that provides court and legislative reports that can be read directly into the system through an optical character scanner. Reports are on file and ready for use sometimes months before formal publication.

GTE used this same service to initially load its computer files with selected documents that covered the years 1974 to 1978.

The system primarily contains full text documents instead of abstracts since abstracting is both a time-consuming and often arbitrary process, Cahill noted.

Cahill said the system is a "significant productivity tool for our professionals, so much so that we may not have to increase the number of lawyers and paralegals despite an increased workload. There is no question that it helps them deliver a better, more current work product. It also means that we can exercise better control of legal efforts."



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F&S: Europeans to Blend Data, Text Processing

Special to CW

NEW YORK — A cumulative \$3.8 billion European market for communicating text terminals over the period 1981-1986 will be characterized by a trend to incorporate data processing — as well as text processing — into these devices, according to a market report by Frost & Sullivan, Inc. (F&S) here.

The study, which examines the four categories of communicating text terminals — telex, teletex, communicating typewriters and communicating word processors — also foresees such devices converging in function with the traditional data terminal and the fast developing microcomputer.

Referring to the text terminal market, F&S project director Joe Savino declared that "very radical and sweeping changes are to take place before long." Within five years, integrated text and data communicating terminals will "begin to become the norm."

Prices to Decline

According to the report, communicating text terminals are assuming "a central position in the developing market for office products." Prices on communicating terminals can be expected to decline by more than half over the study time frame and on teletex and communicating word processors by more than one-third.

As a result, the market cannot help but to expand rapidly, F&S said. The study, whose market focus is on Europe, provides the following projections:

Shipment of Communicating Text Terminals
(Units in 1,000)

Type of Terminal	1981	1986
Communicating Typewriters	6.5	84
Data Terminals	166.0	645
Display-Based Word Processors	11.0	39
Nondisplay-Based Word Processors	36.0	105
Teletex	1.5	30
Telex	44.0	67
Text-Capable Data Terminals	11.0	228

Another conclusion: Teletex will increasingly replace telex service.

F&S defines a communicating text terminal as a device that can be used to create text and then transmit it over telephone lines or data circuits. Communicating word processors are distinguished from communicating typewriters by virtue of their larger displays and significantly better text editing, document and file handling, printed output formatting and communications capabilities.

Furthermore, all such communicating text devices are of a quality matching that of an office typewriter — at least able to handle upper- and lowercase text, numerics, punctuation and common symbols such as asterisks. Such devices offered by some 500 suppliers throughout Europe typically comprise an input device, processor, nearly always a keyboard, often a display and at times, a printer.

Among such terminals, user prefer-

ence in Europe is turning toward screen-based devices, F&S reported. Indeed, such screen-based WP devices will outsell terminals having no display for the first time this year.

Also, in a trend reversal, users are opting to buy stand-alone systems over shared-logic systems, thanks to the advent of new technologies such as local area networks. It is now possible to buy four stand-alone stations that share two printers at a price that is broadly similar to an equivalent shared-logic system," Savino said.

In an analysis by country, the re-

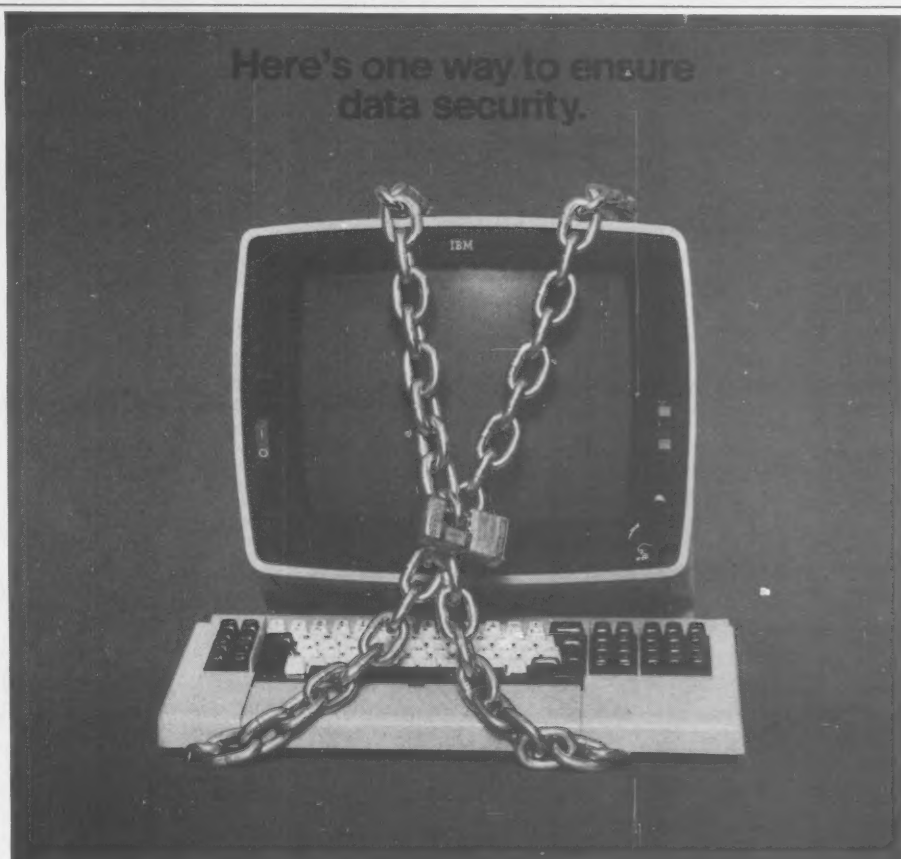
port found that West Germany hopes to become a European leader in the field of teletex following a service launch in early 1981. France, too, of course, has ambitious plans to develop electronic mail services based on videotex, teletex and facsimile terminals as part of its far-reaching national Telematique program.

The study, analyzing communicating text terminals and peripheral effectiveness, warns that keyboard arrangements that do not use the conventional Qwerty layout or a close relative will "not find wide

use" in the market.

It is just the opposite for certain alternative forms of input — for example, recognition and handwriting devices, with regard to general-purpose text terminals; and bar code and magnetic card readers applied to special purpose terminals. "These will take an increasing share of the market," the report said.

The study (No. E463) also pointed to the so-called comb mechanism used in line printers that will become "increasingly important" because it is "simple" and reliable.



Here's another.

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Ask American H about its new Bu

We did. We asked American Hospital Supply Corporation, a worldwide manufacturer and distributor of health-care supplies. American Pharmaseal, a division of American Hospital Supply, was the first to install the B 5900. And its response was so overwhelmingly favorable we thought anybody involved with computers would be interested in an actual user's experience with the B 5900. Satisfied users like American Pharmaseal are one of the strengths of Burroughs.

Here's what Mr. Harvey Cohen, Director of Management Services at American Pharmaseal, who's been in the data processing business for seventeen years, had to say . . .

"It's an awesome achievement. The thing that makes it all the more impressive is that the darn thing performs as advertised."

The last conversion.

"The B 5900 is an entry level system in a class of systems that ranges up through the largest machines that Burroughs makes, all of which have the same software and the same operating environment. So once people get on to the B 5900, they may replace processors, they may upgrade systems, they may add components—but the operating environment will remain the same all the way up the

line. So once you have made it, it is the last conversion."

Advanced technology.

"I am not an electronics expert, but the internal hardware architecture of the system appears to be a major advance in technology. I was told that the B 5900 is the first computer with the Burroughs multi-level Function Processor architecture, an internal structure of computers within computers. That's one of the reasons why the productivity is higher while the physical size and power consumption are smaller."

Terrific hardware.

"The processor has been rock solid. The memory has been rock solid. We have not had a single problem. When I consider the processor and the memory, which are the parts of the system that are really new—I can't say anything bad about them. They have been tremendous."

Best operating software.

"My experience since 1970 has been with Burroughs equipment. They have, in my opinion—and I think it's generally recognized in the industry—the best operating software around."

Higher productivity.

"The downtime on the processor was so low that the Burroughs people were afraid nobody would believe it. So I think they wrote it



Hospital Supply Burroughs B5900.



up on the acceptance test as 99.8%. Now with that kind of experience, is it any wonder I would recommend the machine?"

In-house time-sharing.

"On the B5900 we are now able to offer in-house time-sharing services to our community of general management people who just didn't have access to that kind of facility before.

Now that they have this alternative, there are a number of other people at American Pharmaseal using outside services who are looking at potentially saving several thousands of dollars a year by doing that work internally."

Total support.

"We expected a high level of support and we received it. In general, though, support has a lot to do with reliability. If the system doesn't break down, your need for support is obviously lower."

User-friendliness.

"There is no question that the ease of use of the software tools that Burroughs provides and friendliness in terms of prompting and keeping you from going down the garden path, so to speak, make it much easier to learn and adapt to the new environment.

From the perspective of my own staff, everything—the workflow, CANDE, the operating system itself, the

language processors, all of the software tools that Burroughs provides—has an impact, a positive impact on their productivity. They are able to sidestep a lot of nit-picking details and just concentrate on getting the job done."

Reliability.

"One part of the B5900's reliability stems both from the design engineering of the system and advances in the quality control of the manufacturing process. The other part is clearly the reliability of the software that goes with the system. I think the design of the hardware and software and the symbiosis between them is the strongest feature of the Burroughs large system environment. When you have that combination, it makes a lot of things happen."

A system to build upon.

"When we were thinking of acquiring a system, our primary consideration was the fact that American Pharmaseal has plans for major expansion in the next few years. So what we were looking for was a system which we could build upon. I am confident that we have that in the B5900."

We'd like to tell you more about the strengths of Burroughs and demonstrate Burroughs systems approach to data processing management. Burroughs Corporation, Dept. CW-46, Burroughs Place, Detroit, MI 48232. For an update on what's happening at Burroughs, call 1-800-521-4866. (In Michigan, call 1-800-482-2402.)

Burroughs Building on strength.

Sometimes It's Smart to Use 'Dumb' Terminals:

By Steve Frankel
Special to CW

One quite natural consequence of the continuing development of computer technology is that the cost of adding intelligence to an otherwise limited product keeps falling. As a result, computerized intelligence becomes increasingly common.

Therefore, in an age when the average home oven can perform functions once reserved for computers, it seems wildly contradictory that dumb devices are still so firmly rooted in the industry responsible for developing the computing technology.

On the surface, it seems especially strange that hundreds of thousands of data processing terminals are still of the teletypewriter-compatible variety. That means that, in some very basic respects, those terminal devices are unchanged from the very first models applied to the data communications function. They seem anachronistic, like horse-drawn buggies on freeways.

The reason this can remain true in light of today's technology — where an impressive amount of computer processing power can be held on the tip of a child's finger — is twofold.

First, today's dumb terminals are not really so dumb. Unlike their early-model Teletype brand forebears, they may have CRT displays instead of impact print mechanisms. They may also have programmable function keys, scrolling and page-swapping capabilities, reversible black-on-white and white-on-black characters, blinking, preformatted data fields, data range checking, programmable cursor positioning and more memory than the average pre-IBM 360 CPU. "Dumb" they may be, but only in some specific teletypewriter-like aspects.

The second reason for their longevity is simply that they can be extremely cost-effective. Their intelligent cousins not only are more expensive to buy, but also more expensive to use. Intelligent terminals have automatic error detection and retransmission on error (ARQ) capabilities, which dumb terminals lack. To implement this key feature, intelligent devices must utilize a sophisticated communications protocol, which in turn usually depends on having some form of synchronous communications facility, including expensive synchronous modems and leased lines.

Those two facts — that dumb terminals can have almost as many intelligent functions as intelligent terminals, and that they are less expensive to buy and use — argue convincingly for their popularity. However, there is yet a better reason: users of minicomputers and mini-based small business systems usually have no choice; they must use dumb terminals.

Although many otherwise knowledgeable minicomputer users do not realize the fact, the vast majority of minicomputer-based systems have no automatic retransmission on error facilities. Their data communications are based on teletypewriter-compatible terminals which, by definition,

operate asynchronously, without communications protocols, and thus without error correction.

While it is true that minicomputer vendors rush to announce support for the latest communications protocols — synchronous data link control, X.25 or whatever — that "support" primarily is intended for CPU-to-CPU or minicomputer-to-network communications; it does not extend down as far as the terminal link. Thus, no error checking is done on the most error-prone segment of the communications link, the phone line serving the terminal.

This is not necessarily a reflection

on Digital Equipment Corp., Data General Corp., Hewlett-Packard Co. or the other mini-makers. Those ven-

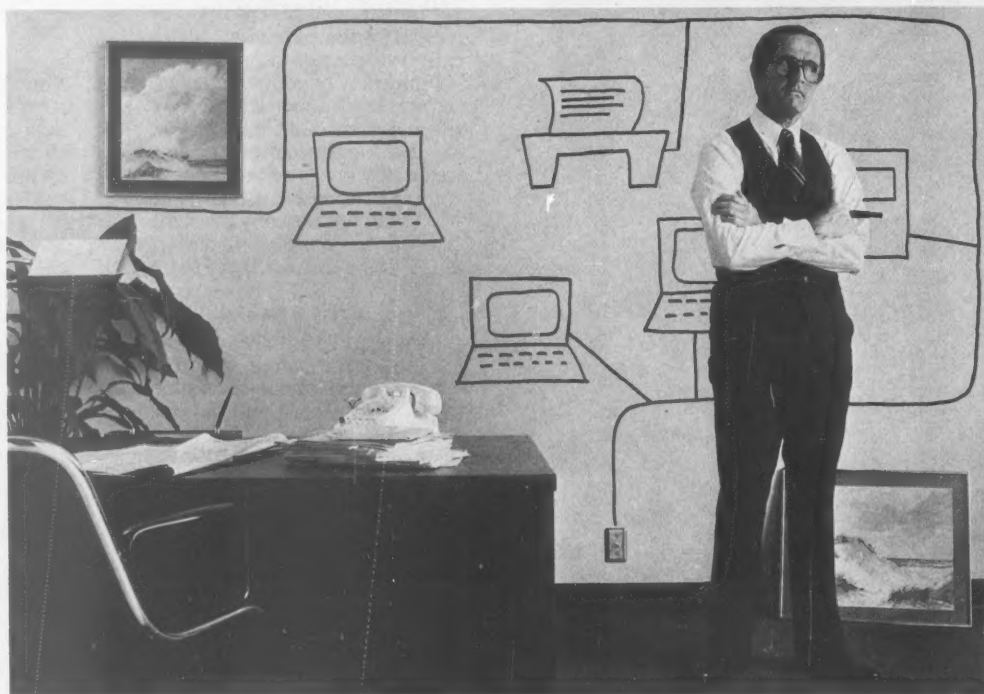
'These two facts — that dumb terminals can have almost as many intelligent functions as intelligent terminals, and that they are less expensive to buy and use — argue convincingly for their popularity.'

dors have their own reasons for not supporting protocols at the terminal

link, and not the least of those reasons is overall cost.

The lack of error checking is simply a fact of life to which the experienced minicomputer user has become accustomed. Did an error creep into a financial summary? Did a momentary glitch mess up a graphics display? No big deal. Rerun that part. It becomes automatic.

Automatic or not, rerunning is a waste of time and money. With even dumb terminals running at up to 9,600 bit/sec on dial-up lines, the rate of line failures becomes significant. Although the U.S. has the best communications network in the



We were here three years ago.

They're Cost Effective and Getting Smarter

world, and although many lines perform more efficiently, telephone companies promise no better than one error in every 100,000 bits transmitted at 4,800 bit/sec — which translates to one character received in error every 21 seconds or so.

That dumb terminals force this upon their users is dumb. But the problem can be remedied.

Fortunately for minicomputer users, but unknown to many of them, Datacom equipment vendors have begun to provide add-on intelligence of various forms of users' low-IQ devices.

In particular, add-on error-correc-

tion devices, about the size of a modem and frequently no more expensive, are now available. These overlay a retransmit-on-error protocol on the dumb terminal's "protocol-less" transmission, and automatically perform their error checking in a completely transparent manner.

In the case of Micom's Micro500 Error Controller, this is called Add-On Data Link Control (ADLC) and the modules are available off-the-shelf at \$795. Somewhat similar devices are available from Intecom and others.

The existence of a vast population of installed minis has encouraged data communications vendors to pro-

vide parallels to many of the mainframe's advanced communications functions. Error control is only one.

Minis Do It, Too

In addition, if mainframes can converse with cluster controllers, minis can do the same through intelligent multiplexers. If the mainframe's front-end processor can perform polling (enabling its terminal network to be configured with cost-saving multidropped phone lines), intelligent statistical multiplexers like Micom's Micro 900 can perform the same function and provide the same savings — independently of the ex-

isting host and its dumb terminals — completely transparently.

Boxes to perform these functions can be had from several vendors. They can be added to existing configurations without changing hardware, software or operating procedures. And although they all tend to equalize the functional balance between intelligent and dumb terminal networks, they do so without unbalancing the cost differential between the two types. In fact, they are cheap.

For those who have a choice, the question of the intelligent vs. the dumb terminal becomes one of cost-effectiveness for a particular application.

Built-In Intelligence

For the majority of applications, the intelligence built into the host computer is adequate to support intelligent functions needed at the remote site. The typical mini can support up to 64 dumb terminals for which it handles the tougher operations — and those terminals may cost between one-sixth and one-tenth the price of smarter devices.

And that price difference is expected to increase, rather than decrease. If today's teletypewriter-compatible, asynchronous-speaking CRT terminal with a sprinkling of special functions runs \$595, within two or three years it will be between \$200 and \$300.

Multiply the difference in cost per unit between intelligent and dumb terminals by the number of terminals involved, and the cost savings — even with add-on intelligent boxes — may reach more than \$100,000, sometimes more than the price of the minicomputer system itself. Then who's to say that the "dumb" terminal isn't the "smart" buy?

Frankel is vice-president of marketing and development for Micomsystems, Inc.



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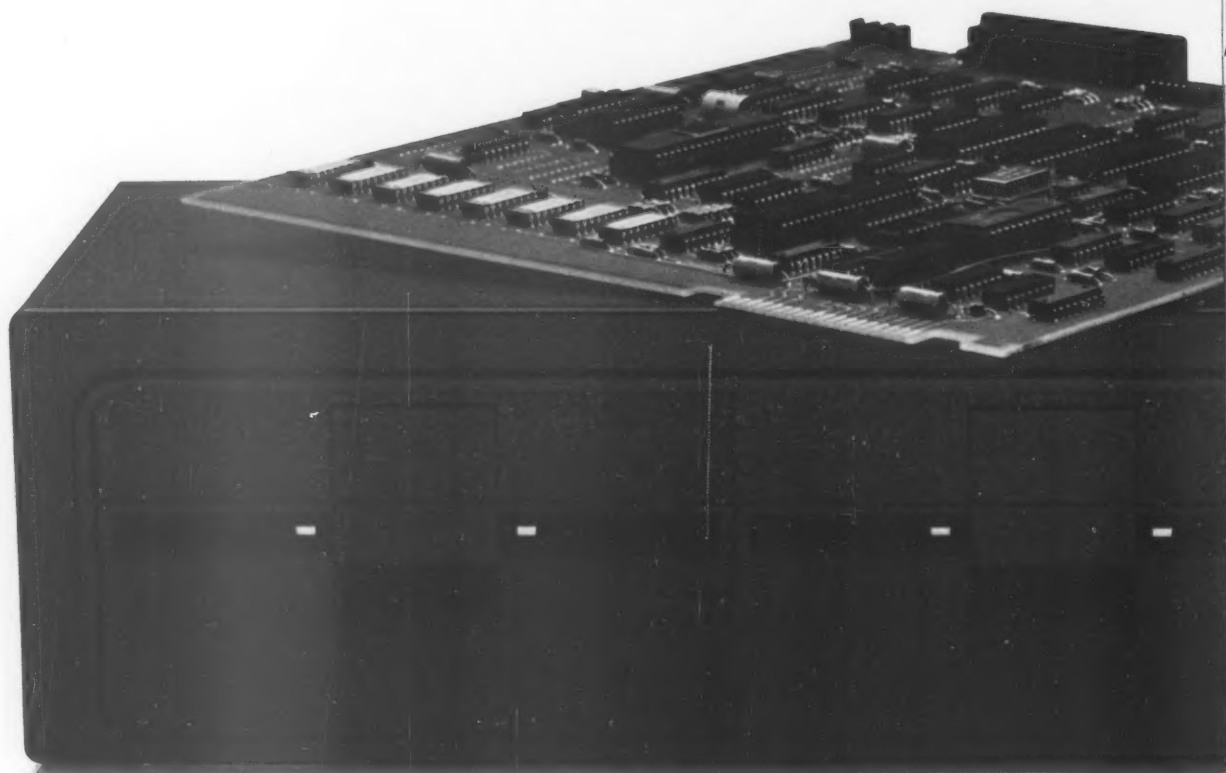
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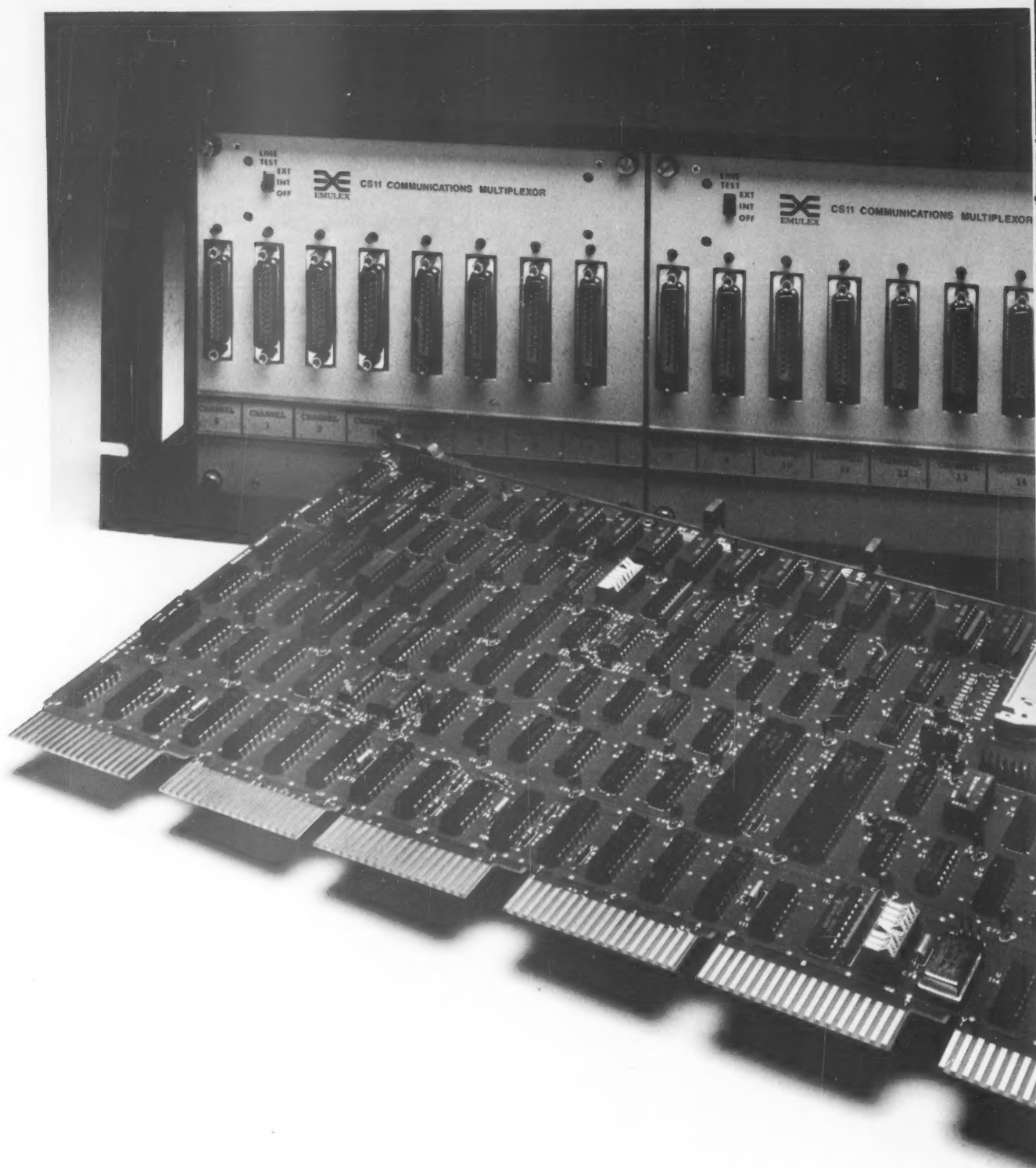
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interface. And because all your interface variations are made at the distribution panels, no additional hardware or cpu restructuring is needed when you add channels.

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'Crossover' Ability Speeds Credit Union Tasks

(Continued from SR/17)

"Currently, however, 18 of our credit union clients have elected to employ about 100 Bunker Ramo CRT display terminal systems at their branches."

Interfacing the Bunker Ramo equipment with the Burroughs host computers has been accomplished without major problems and provides many benefits, Darlege observed. "Credit unions with assets of as little as \$10 million to \$12 million can easily afford the Bunker Ramo teller systems," he added.

Bunker Ramo on-line teller systems for credit unions include small, 5-in.

"This new ability to literally "mix and match" computer equipment to meet the specific desires or requirements of each individual credit union has been the primary factor in the rapid recent growth of these "crossover" or hybrid systems throughout the credit union industry.

The primary objective of utilizing such "crossover" systems is to provide the best possible electronic support for each credit union's branch operations and to maximize the cost/productivity ratios associated with handling everyday customer transactions such as share deposits and withdrawals, loan payments and disbursements . . .

screen terminals for teller use, larger optional 12-in. terminals for account file maintenance and other administrative tasks, electronic or electrome-

chanical validation/journal printers and powerful minicomputer-based Programmable Control Units (PCUs) that control the operation of all

branch terminals, printers and ATMs, and store transaction data, and interface all branch equipment with whatever host computer the credit union is using via standard phone lines.

The Dearborn Federal Credit Union, the largest credit union in Michigan and among the largest in the nation, made the crossover move three years ago. With approximately 85,000 members, most of them salaried employees of Ford Motor Co., a typical payday can mean as many as 20,000 financial transactions must be completed by the credit union's tellers.

"Our main processor, or host computer, has always been a Burroughs," stated Thomas M. Begue, DP manager for Dearborn Federal.

Opted for Bunker Ramo

But the credit union's management opted to go with Bunker Ramo teller terminals, validation/journal printers and PCUs, plus a Bunker Ramo-provided Banktran software package. "The decision was based on the availability and flexibility of the software and the modularity of the teller station equipment and minicomputers," said Begue. "For us, the crossover decision has worked very well."

As noted earlier, Burroughs computers are not the only ones to which modern on-line branch office terminals and other peripheral equipment can be interfaced.

In another example, the 27,000-member State Department Federal Credit Union located in Washington, D.C., uses Diebold automatic teller machines interfaced to a Hewlett-Packard mainframe.

Credit Unions

The Credit Union National Association (Cuna), headquartered in Madison, Wis., performs DP for some 300 credit unions in 33 states. With the use of individualized software, the various types of on-line equipment located at these credit unions is successfully interfaced with Cuna's host IBM mainframe in Dallas.

Computer terminal and peripheral equipment manufacturers said there is no longer any reason for credit unions to consider branch terminal equipment that cannot be interfaced with a wide variety of host computers.

"We are developing equipment to interface with all communications-oriented computer mainframes manufactured today," according to Stephen Grosky, a vice-president with Bunker Ramo's Information Systems Division in Trumbull, Conn.

It is by no means farfetched, therefore, to say that credit unions and other financial institutions now have the choice of shopping first for the best package in teller terminal systems and then deciding whether they want to utilize an existing mainframe, order another mainframe with communications capabilities from the same or another manufacturer or contract with a service bureau to provide the host computer for their on-line terminal system.

Friis is a free-lance writer.

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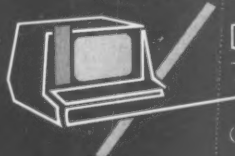
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Links Customer, Supplier

Portable Terminal Keeps Eye on Inventory

Special to CW

HOUSTON — Research and photographic laboratories must maintain an adequate inventory of vital chemicals and supplies. To help its lab customers, VWR Scientific, Inc. provides access to direct sales ordering of laboratory and photographic equipment. The key to this direct link between the customer and the supplier is a portable terminal.

VWR, a subsidiary of Univac Corp., is one of the top three national distributors of laboratory and photographic supplies and equipment. Headquartered in San Francisco, VWR's operations include two departments. The scientific group distributes lab equipment, supplies and chemicals; and the graphics department handles photographic equipment, supplies, film and reproduction equipment.

VWR has a diverse group of customers, including university and governmental labs, electronics companies, hospitals and quality control labs, all serviced by branch offices nationwide.

VIP Program

To help its customers communicate diverse equipment needs faster and more efficiently, VWR has developed a computer software program called the VWR Interactive Purchasing System (VIP). With the Texas Instruments, Inc.'s Silent 700 Model 745 portable terminal, VWR's customers can tie directly into host computers around the country to check stock, verify prices and back orders, place orders and code special messages on orders.

"VIP is a remote sales order entry system that allows customers to stay in touch with us from their place of business by simply typing supply and equipment needs into the 745 terminal," John Saylor, marketing manager of VWR, said. "We also use the TI 745 terminals to demonstrate other capabilities of the VIP system to our prospective customers."

"When we first designed the VIP ordering system, it was difficult to demonstrate its benefits because we used equipment requiring the installation of special telephone jacks at the customer's office," Saylor said. "Now with the terminal's built-in acoustic coupler, our salesmen can demonstrate the VIP system by hooking the terminal to the nearest phone and standard electri-

cal outlet. The terminal has become a very effective sales tool for our company."

"Our customers have also found that the TI terminals are very helpful in maintaining smooth operations, so that unexpected supply shortages do not arise," Say-

lor said. "If our customers notice a short supply, they can order through the 745, without normal delays from using the mail."

Several additional features have made the 745 especially attractive for VWR's customers. According to Jim Howe,

buyer at Core Laboratories in Dallas, "The terminal's compact size is very convenient. Its typewriter-like keyboard is extremely easy to use, and it is very quiet during operation." The terminal's thermal printer works in virtual silence, producing hard copy

at speeds up to 30 char./sec.

"Our turnaround time on orders has been reduced from two weeks to one week," Howe said. "Fewer mistakes are made on orders because we have direct access to VWR's host computer."
(Continued on SR/38)

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Report Lists Teleprinters in Communications

More Charts On SR/38

Complete Addresses Of Vendors On SR/50 and SR/51

CHERRY HILL, N.J. — As communications networks proliferate, more and more terminals are being tied to both central and remote computer facilities. The result is that users have a huge, often bewildering array of terminal devices from which to select.

Although display terminals are often preferred for their fast response and graphics capabilities, most applications still require some nondisplay teleprinter devices. And there are numerous applications where the low-cost teleprinters are entirely adequate.

Data Decisions, Inc., publishers of the monthly updated "Computer Systems" looseleaf information reference service, has recently released a comprehensive report detailing the features of printing terminals that can be employed in a communications environment. Models covered involve all keyboard or receive-only printers that can be directly coupled to communications facilities or to CRT terminals via an RS-232C or current loop serial interface.

Company and model listings include both the terminal manufacturer and the independent national dealer-distributors. The Data Decisions report presents specifications on 244 teleprinter models that are produced by 80 vendors. In addition, the products handled by 43 dealers and distributors are identified.

Each product listed in the full report contains detailed information about terminal workstation configurability, the terminal printer unit, interface/communications capability and prices. A dot chart is also included in the report that helps the reader locate vendors who manufacture or market teleprinters with any combination of up to 25 specific characteristics (see accompanying chart).

A free executive summary of the teleprinters report is available from Data Decisions. A copy of the entire report with full details costs \$25. The firm is located at 20 Brace Road, Cherry Hill, N.J. 08034.

Code Competibility	Number of Vendors Offering Products
ASCII	119
EBCDIC	20
APL	50
Baudot/Other	50

Source: Data Decisions, Inc.

Classes of Available Terminals

COMPANY	Teleprinter Manufacturer Sales/Leasing Company	NO Teleprinters KCSF 140 Portable Programmable Teleprinters	5 to 20 cpm 31 to 60 cpm 61 to 120 cpm 121 to 180 cpm	25 cpm 35 cpm 45 cpm 55 cpm	Print Rate Print Rate Print Rate Print Rate	Non Impact Matrix Printer Impact Matrix Printer Full Character Full Character	ASCII Set/Code ASCII Set/Code ASCII Set/Code ASCII Set/Code	40 col @ 10 cpm Line 80 col @ 10 cpm Line 132 col @ 10 cpm Line IBM 2701/2741	Replacement Replacement Replacement Replacement
Agile Corporation	—	—	—	—	—	—	—	—	—
Alanthus Data Communications	—	—	—	—	—	—	—	—	—
Alphacom Incorporated	—	—	—	—	—	—	—	—	—
American Computer Group	—	—	—	—	—	—	—	—	—
Anadex Incorporated	—	—	—	—	—	—	—	—	—
Anderson Jacobson	—	—	—	—	—	—	—	—	—
AT&T/Bell Telephone System	—	—	—	—	—	—	—	—	—
Axiom Corporation	—	—	—	—	—	—	—	—	—
Beehive International	—	—	—	—	—	—	—	—	—
Braegen Corporation	—	—	—	—	—	—	—	—	—
Burroughs Corporation	—	—	—	—	—	—	—	—	—
Cal Datacom	—	—	—	—	—	—	—	—	—
Carterfone Communications	—	—	—	—	—	—	—	—	—
Centronics Data Computer	—	—	—	—	—	—	—	—	—
ComData Corporation	—	—	—	—	—	—	—	—	—
Computer Devices	—	—	—	—	—	—	—	—	—
Computer Maintenance	—	—	—	—	—	—	—	—	—
Computer Printers International	—	—	—	—	—	—	—	—	—
Computer Transceiver Systems	—	—	—	—	—	—	—	—	—
Continental Resources	—	—	—	—	—	—	—	—	—
Control Data	—	—	—	—	—	—	—	—	—
Data Access Systems	—	—	—	—	—	—	—	—	—
Data General	—	—	—	—	—	—	—	—	—
Data Rental/Sales	—	—	—	—	—	—	—	—	—
Data Terminals & Communications	—	—	—	—	—	—	—	—	—
Dataproducts Corporation	—	—	—	—	—	—	—	—	—
Dataroyal Incorporated	—	—	—	—	—	—	—	—	—
Datasouth Computer	—	—	—	—	—	—	—	—	—
Datel-Intersil	—	—	—	—	—	—	—	—	—
David Jamison Carlyle	—	—	—	—	—	—	—	—	—
Danco Data Equipment	—	—	—	—	—	—	—	—	—
Diablo Systems	—	—	—	—	—	—	—	—	—
Di/An Controls	—	—	—	—	—	—	—	—	—
Digi-Data Corporation	—	—	—	—	—	—	—	—	—
Digital Equipment	—	—	—	—	—	—	—	—	—
Dip Incorporated	—	—	—	—	—	—	—	—	—
Eastern Peripherals	—	—	—	—	—	—	—	—	—
Eastern Terminals & Communications	—	—	—	—	—	—	—	—	—
Eastmark Corporation	—	—	—	—	—	—	—	—	—
Epson America	—	—	—	—	—	—	—	—	—
Extel Corporation	—	—	—	—	—	—	—	—	—
Facit Data Products	—	—	—	—	—	—	—	—	—
Federal Communications	—	—	—	—	—	—	—	—	—
Florida Data	—	—	—	—	—	—	—	—	—
Fujitsu America	—	—	—	—	—	—	—	—	—
General Electric	—	—	—	—	—	—	—	—	—
Hamilton Rentals	—	—	—	—	—	—	—	—	—
Hansen & Hughes	—	—	—	—	—	—	—	—	—
Heath/Zenith	—	—	—	—	—	—	—	—	—
Hewlett-Packard	—	—	—	—	—	—	—	—	—
Honeywell Information Systems	—	—	—	—	—	—	—	—	—
IBM	—	—	—	—	—	—	—	—	—
Information Technology	—	—	—	—	—	—	—	—	—
Infoscribe Incorporated	—	—	—	—	—	—	—	—	—
Integral Data Systems	—	—	—	—	—	—	—	—	—
Interface Systems	—	—	—	—	—	—	—	—	—
International Entry Systems	—	—	—	—	—	—	—	—	—
C.Itoh Electronics	—	—	—	—	—	—	—	—	—
Kalbro Computer Sales/ICE	—	—	—	—	—	—	—	—	—
Lear Siegler	—	—	—	—	—	—	—	—	—
Leasametric	—	—	—	—	—	—	—	—	—
Lexicon Corporation	—	—	—	—	—	—	—	—	—
Local Data	—	—	—	—	—	—	—	—	—
Loomam Computer Terminals	—	—	—	—	—	—	—	—	—
Malibu Electronics	—	—	—	—	—	—	—	—	—
Mannesmann Tally	—	—	—	—	—	—	—	—	—
Matchless Systems	—	—	—	—	—	—	—	—	—
Memorex Corporation	—	—	—	—	—	—	—	—	—
Micro Peripherals	—	—	—	—	—	—	—	—	—
Microtek Incorporated	—	—	—	—	—	—	—	—	—
MTI Computers & Peripherals	—	—	—	—	—	—	—	—	—
National Computer Communications	—	—	—	—	—	—	—	—	—
NCR Corporation	—	—	—	—	—	—	—	—	—
NEC Information Systems	—	—	—	—	—	—	—	—	—
Northeast Services	—	—	—	—	—	—	—	—	—

To Aid Copper Mine CRT Terminal Goes 3,000 Feet Underground

Special to CW

TOOLELE, Utah — A computer has joined the miner's lamp and pick here, helping a mining firm wrest minerals from far below the earth's surface.

Engineers at Anaconda Copper Co.'s new \$216 million copper mine rely on an underground IBM 3270 CRT terminal to help keep equipment running deep beneath the Oquirrh Mountains.

"The company has several million dollars invested in mobile and fixed equipment," according to Lloyd Vowles, Anaconda's DP manager. "We use the terminal to help schedule preventive maintenance to try to avoid breakdowns. It also helps us order parts and control equipment costs."

The CRT terminal is located in a small, furnished office with a picture window that overlooks a well-lighted, spacious cave, carved from rock and layered with cement to reduce dust. Situated 3,000 feet underground, this area is Anaconda's equipment maintenance and repair "garage."

Aids Maintenance

Linked to an IBM 4341 computer in the mine office aboveground, the terminal assists maintenance specialists in speeding parts for the company's mine fleet of more than 100 mobile units, its underground rock-crushing plant and its numerous conveyors, pumps, fans and related electrical devices.

"We demand 80% availability or better for the equipment," said John Harmon, maintenance planner. "The IBM terminal helps us reach that goal. It's an important tool in our planning and carrying out preventive maintenance schedules for every piece of equipment in the mine."

Major Enemies

The major enemies of mining are dirt, water and lack of room to readily maneuver equipment in the almost five miles of access tunnels and ore drifts.

Water pumps work around the clock. A failure of pumps beyond 10 hours would result in serious flooding, mine experts said. Giant ventilation shaft fans, also operating around the clock, are vital to maintain production.

A huge \$140,000 diesel-powered ore loader can quickly deteriorate in the 12-ft wide tunnels if not carefully maintained. Backhoes, graders, scoop trams, trac-

tors, mobile drill machines, locomotives and rail cars all must undergo regular maintenance checks, along with electrical equipment.

Without underground maintenance, the machinery would have to be lifted to the surface whenever work was

needed, a time-consuming operation that keeps it out of service for lengthy periods. Anaconda maintains a warehouse aboveground that stocks 7,000 items representing \$4 million in parts and supplies. A few parts and tools are stocked in under-

ground cribs.

When a part is needed underground, an engineer hits a few keys on the computer terminal's keyboard to display the part number, description, location in the warehouse, quantity desired and availability.

If available, the part is ordered from the warehouse via the terminal, often with same-day delivery service. If unavailable, a purchase requisition is prepared manually.

Each piece of equipment is
(Continued on SR/40)



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Terrestrial to Satellite Switching Creates Options,

By Joseph A. Sciuilli
Special to CW

The economics of long distance telecommunications via satellite have created new applications and opportunities for data communications users. Unfortunately, the protocols, data modems and echo control devices developed for terrestrial data

communications systems may create problems for a user switching transmission facilities from terrestrial to satellite.

The problem is that most of the systems developed for terrestrial data communications were not designed to accommodate the long propagation time delay of trans-

mission via a satellite. The reason for the time delay is that the altitude of a satellite in geostationary orbit is nearly 36,000 kilometers above the earth's surface. This corresponds to a one-way time delay that can range from 300- to 350 msec from transmitting terminal to receiving terminal.

The impact of this delay can be measured in terms of reduction in data throughput efficiency plus potential modem and protocol malfunctions due to mishandling of delayed echoes.

Impact on Throughput

The data communications protocol most widely used

today is IBM's binary synchronous communications (BSC) protocol. The BSC protocol employs a transmit, stop and wait error control technique with automatic request for retransmission (ARQ). Data is transmitted in contiguous blocks with each block comprising a fixed number of bits. Each block is acknowledged via the reverse ARQ channel. If a block is error-free, the next block is transmitted. A block with errors is retransmitted.

Over a satellite channel it may take up to 700 msec for a data block to travel nearly 50,000 miles to the distant terminal and for the acknowledgement signal to return the 50,000 miles in reverse. This delay reduces the amount of useful data transmitted per unit time.

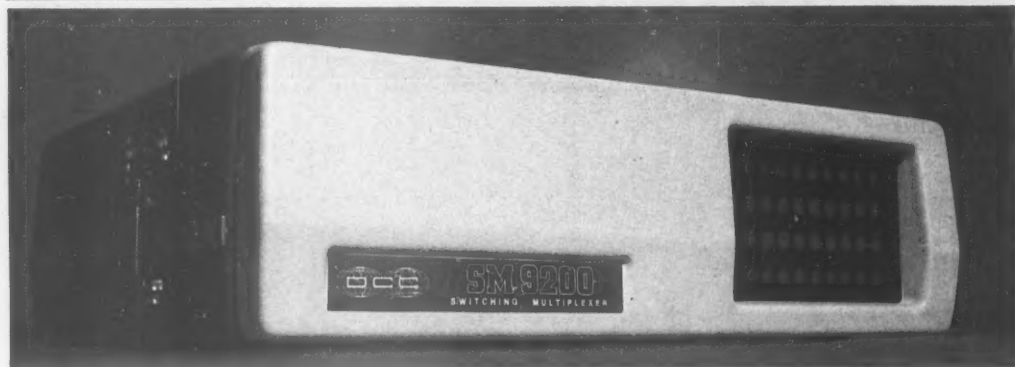
The use of forward error correction (FEC) coding is often suggested to improve the throughput by reducing the error rate. However, this approach is usually not the answer either, since the implementation of FEC requires transmission of a significant number of overhead bits, which limits the maximum achievable throughput efficiency even at very low error rates.

Impact of Echo

Since echo is nonexistent on wideband (more than 9,600 bit/sec) data circuits and on end-to-end four-wire voiceband circuits, only two-wire voiceband circuits require echo protection. Echo is caused by imbalance in the devices used to couple two-wire local distribution circuits to four-wire long-distance circuits. The result of this imbalance is to cause part of a received signal to be returned from the far end of a four-wire circuit to the sending terminal.

For many years, echo suppressors have been used to control this problem on circuits longer than about 1,800 miles. An echo suppressor, basically, is a switch. When the receive side of a four-wire circuit is in use, the suppressor opens the transmit side to prevent signal leakage, and thus prevent echoes. The suppressor then restores the transmit connection.

Echo suppressors, data modems and protocols designed for terrestrial circuits cannot adequately compensate for the additional delay of the satellite on the returned echo signal. A typical malfunction in the data modem is caused when acknowledgement signals from the distant end do not arrive within the pre-

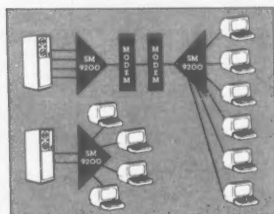


Is switching data a problem?

Then here are four reasons why you'll love DCC's switching multiplexer.

DCC's SM9200 Switching Multiplexer offers all the advantages of statistical multiplexing—reduced telephone line costs and error free messages. But our Switch Mux also offers you Port Contention, Port Selection and Data PABX.

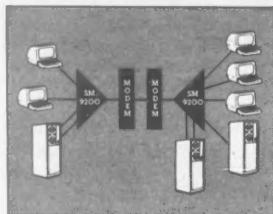
1. Port Contention



The Switch Mux allows a user to contend for any host port in either the local or remote location. Rotary group selection, speed conversion and unbalanced configurations are also standard. Costs savings are realized by reducing the number of computer ports and the size of the multiplexer configuration.

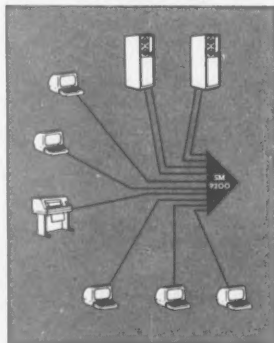
2. Port Selection

You can connect any terminal to any computer or terminal locally within your facility, or remotely to any port within another facility.



Using the advantages of statistical multiplexing, these facilities can be located thousands of miles apart.

3. Data PABX



Interconnect up to 64 local data devices to create a total intrafacility switched network. Functions such as shared computer resources and electronic mail can inexpensively be implemented. Through an optional supervisory port connection status and other system parameters can be easily displayed.

4. \$2,200 . . .

Domestic U.S. price for a standard 4 port model starts at \$2200 FOB Germantown, Maryland. Delivery is within 30 days.

Call or write DCC's Data Com Marketing Department for full details on how the SM9200 can help solve your networking problems and save you money.

Options available with the SM9200 Switching Multiplexer:

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- Reverse Flow Control
- Autobaud
- Supervisory Port
- Backup high speed link



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Problems for Data Communications Users

scribed time interval. In some cases, the modem might shut down because it interprets the failure of the far end to respond as some type of circuit malfunction.

Another type of failure may occur simply because the protocol has a time-out feature that does not allow for the longer time delay of the satellite circuit.

Another limitation is how well the particular FEC code used is matched to the types of errors that occur. For example, FEC codes designed for the error environment of satellite links do not necessarily work well in the burst error environment typical of terrestrial circuits.

The ultimate solution is to use continuous transmission with automatic request for retransmission. Continuous transmission means that data blocks are transmitted one after the other without waiting for block-by-block acknowledgement from the receiving end.

When a block is received in error, an ARQ is generated and the transmitting end responds by interrupting the current transmission in order to retransmit some earlier data block(s). In fact, newer protocols, such as high level data link control and a subprotocol, synchronous data link control are equipped to perform this selective repeat ARQ function.

In order to employ a satellite circuit successfully, a BSC user must install either a software solution or external equipment, sometimes called a satellite-delay compensation unit, to provide continuous block transmission to the satellite channel while emulating the stop and wait ARQ protocol to the business machine.

A few manufacturers offer such products for both voiceband and high-speed data communications. American Satellite Co. offers a satellite delay compensation unit for operation on voiceband data circuits up to 9,600 bit/sec. Bunker Ramo Corp. has developed the BR 1720 satellite data system, which operates at data rates from 56K bit/sec to 6.3M bit/sec. Both systems claim to operate without modifications to existing hardware or software.

Many of the problems caused by echo on satellite circuits will be resolved as echo cancellors are introduced as replacements for echo suppressors. An echo cancellor attacks the problem by generating a replica of the echo signal.

Instead of opening and closing the transmission paths like an echo suppressor, a cancellor subtracts the echo replica from desired signal plus echo and allows the desired signal to pass, essentially unimpaired. Echo cancellors are now readily available and are being installed in many satellite

voiceband circuits.

In the interim, some problems will be encountered with some modems, particularly the Bell System types 202S and 208B modems and similar units.

Since presently available two-wire full-duplex modems are split-band types, echo should have no effect;

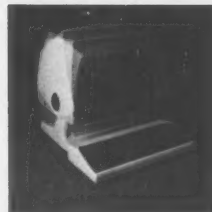
the return (echo) signal is outside the receive band. Half-duplex types without supplementary tones should operate satisfactorily as long as the modem is equipped with satellite time delay compensation and the echo suppressor is aligned and operating properly.

Half-duplex types with

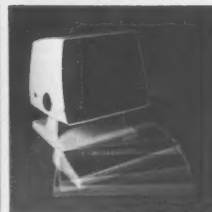
supplementary tones like the 202S with reverse channel, the 208B and similar types are susceptible to delayed echoes on satellite circuits. Modems of this type rely on receiver squelch to avoid the effects of echo.

Sciulli is president of Telecommunications Techniques Corp., Gaithersburg, Md.

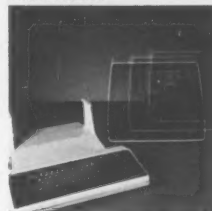
EASIER.



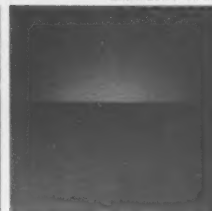
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Easier To Move Elsewhere

It's a word that best summarizes the benefits of the Memorex 2078 Display Station. Important benefits for users of some of today's most popular CPUs, including the IBM 43XX. And of today's most advanced

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Space is always at a premium, be it on a desktop or an entire office work area. Which is why Memorex made the 2078 both compact and versatile. The whole package measures just 17" wide by 19" high by 24" deep. And it weighs a mere 55 pounds. A detachable keyboard and a removable monitor

that can be conveniently placed on a shelf, further increases workspace efficiency.

The 2078 Is Easier To Get The Way You Want It.

It can be ordered with your choice of five screen capacities, from 960 to

3564 characters. With many keyboards, including 75-key EBCDIC typewriter, ASCII typewriter and EBCDIC data entry as well as 87-key ASCII typewriter and EBCDIC typewriter with numeric pad. And an impressive list of options, including selector light pen, security keylock, an unprotected field indicator and a special conditions alarm.

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Teleprinters: A Survey From Agile To Xerox

(Continued from SR/34)

COMPANY	Teleprinter Manufacturer Sales/Leasing Company	NO Teleprinter KSR/AB Teleprinter	Portable Teleprinter	Programable teleprinter	5 to 30 cps Print Rate	30 to 60 cps Print Rate	60 to 120 cps Print Rate	120 to 180 cps Print Rate	Non-Tapeless Multi-Printer	ASCII Sear/Code	ASCII Sear/Code	ASCII Sear/Code	40 col @ 10 cps Line	132 col @ 10 cps Line	IBM 2140/274 Replacement	IBM 3208/3161 Replacement	Expansion/Condensed Print	Graphic Capability
Novell Data Systems	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Okidata Corporation	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Olivetti Corporation/OPE	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Perfec Computer	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Plessey Peripheral Systems	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Printer Systems	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Printer Terminals	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Printronic Incorporated	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Qantex/NAI	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Qume Corporation	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Qwikterm Incorporated	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Qwint Systems	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Qytel Data Terminal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Randal Leasing	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RCA Service Company	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Rental Electronics	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Sanders Technology	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
SCI Systems	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Selecterm	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Siemens Corporation	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Southern Systems	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Sperry Univac	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Systematics General	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Teleprinter Corporation of America	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Telex Terminal Communications	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Teletype Corporation	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Talper Incorporated	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Terminal Systems	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Texas Instruments	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Trans-Lux Corporation	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Transnet Corporation	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Trendata/AMC	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Trendcom Corporation	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Trilog Incorporated	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Tymshare Corporation	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
United States Instrument Rentals	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unitronix Corporation	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Vardon & Associates	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Victor Data Products	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Vitek Corporation	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Western Union Data Services	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Western Union Telegraph Company	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Westwood Associates	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Xerox Corporation	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Data Decisions Chart

Teleprinter Product Survey

TI Data Terminal Keeps Tabs on Inventory

(Continued from SR/33)
ers. And, we can verify shipping
dates through the terminal by enter-

ing the proper code. The terminal
tells us almost immediately what
VWR has shipped and its estimated
arrival date."

Another VWR customer, Sue Williams, storeroom procurement officer for University of Houston's chemistry department, also finds using the TI terminal beneficial for direct sales ordering. "We can see what we're ordering in an instant," Williams said. "The 745 is convenient, compact and very easy to use."

"VWR expects to expand the use of the 745s to more customers and to more applications," Saylor said. "For instance, we have plans to provide inventory control assistance for our customers with the 745."

"Although the system was initially designed for use by our customers, many of our field salesmen can now use the TI terminal to check stock levels, prices and information on orders," Saylor added.

"In the past, our salesmen had to phone VWR's local branch during office hours to get the information they needed. That made their sales effort less efficient, and required a great deal of time.

"With the portable 745, the field salesman can now get the information for our customers whenever it is needed."

Productivity Increased

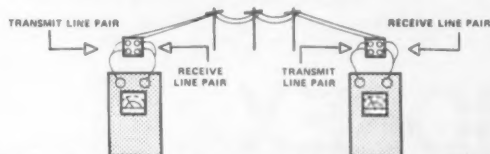
"The productivity of our sales force has tremendously increased using the TI terminals and the VIP system," Saylor said. "In less than one year our VIP orders have gone from 200 to 3,000 a month and we have had a sharp monthly increase in sales."

"In addition, the TI terminals have enabled us to greatly increase our sales volume without increasing our sales force. As a matter of fact, we have increased service to our customers. We have saved \$70,000 in people cost and we expect that figure to triple in the coming months," Saylor added.

The TI 745 portable data terminals have made the VIP system work more efficiently for VWR and its customers. With the 745s, VWR has developed a direct order-entry system that operates as a fast, reliable communications network benefiting both the company and the customer.

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The TP-260 Data Line Tester offers the user the ability to test both dedicated and dial-up telephone lines and get a quick indication of suitability for data transmission. The unique design of the TP-260 is such that these tests can be carried out by unskilled persons and results are read directly in terms of tariffed requirements for data lines.



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- Hand-held, battery operated
- Audio output tests continuity, circuit noise

- Solid state, integrated circuit design
- Trouble shooting can be accomplished by unskilled personnel



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Labor Reporting System Keeps Tabs on Employees

Special to CW

PORT HURON, Mich. — An automated labor reporting system has greatly improved productivity and cost control at the Mueller Brass Co. here.

Before the new system was installed, time and attendance data were recorded in the traditional way by time clock. Production information, such as piece-count data, was reported by having employees fill out forms and pass them up through the administrative chain for data entry.

Information reported by this system often was inaccurate and usually late, according to Richard H. Rice, manufacturing manager of the Fabricated Products Division. The Port Huron complex employs some 1,200 people, with some departments having as many as 85 to 90 people working one shift.

Now, time attendance and production information are input through 26 multifunction terminals and five badge readers; they are connected to a minicomputer with 64K bytes of main memory. The Data Pathing System Division of NCR Corp. supplied the hardware, as well as the related software, on a turnkey basis.

The badge reader was designed as a time and attendance reporting terminal. Employees clock in and out by inserting their badges in the badge reader. The multifunction terminal, which can record time and attendance information, also is designed for entry of labor data, such as piece-counts and scrap reporting.

The employee inserts his badge in the terminal's badge reader and an 80-column job card in the card reader. The employee then enters such data as the machine number, number of parts produced and amount of scrap. All the employee does is key in his production data. Employee identification, job identification, material and other data are entered automatically through the badge reader and card reader.

Tracks Mistakes

According to project manager Tom Parker, "it is difficult to make a mistake. The operator is led through the entire process of data entry by an alphanumeric display. All the employee has to do is follow the directions as the terminal displays them. If an error is made, the terminal stops the process and instructs the employee how to correct it."

Data from both types of terminals is immediately transmitted to the minicomputer, where it is first recorded on magnetic tape and then used to process reports — for example, attendance at the beginning and/or end of a shift and piece counts by employee. The reports are output on line printers in each foreman's office.

Information is also available to the employees themselves. Some employees actually go to the foreman and ask to see an audit so they know that what has been reported through the terminal has been received cor-

rectly. This is one reason for the acceptance of the terminals by the employees, Parker said.

The data collected on magnetic tape is removed from the NCR minicomputer at the end of the shift and mounted on an IBM 370 host computer for processing. The host computer merges the time, attendance and piece-count data into the payroll programming system so at the end of the week, checks can be calculated without any further data entry.

Very little change was necessary in
(Continued on SR/40)



Mueller Brass employee checks in with badge reader.

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Mike Kirk, President
ITA International, Inc.
Kansas City, Missouri

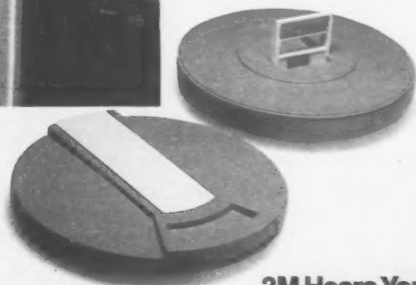
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An operator retrieves parts data on the display screen of an IBM 3270 terminal some 3,000 feet underground at Anaconda's copper mine. An explosives vehicle awaits repairs.

IBM Goes Underground To Aid Mining Company

(Continued from SR/35)

identified by its code number, which is stored in the computer. As equipment falls due for maintenance, a foreman obtains a computer printout of the work required. After tasks are completed, results are fed into the computer via the 3270 to update the equipment's history.

Harmon said the computer enables Anaconda to know precisely what has been spent on any piece of equipment, including labor and parts costs.

Management then has readily avail-

able facts to determine whether the company should make repairs, rebuild the entire unit or replace it with new equipment.

"Much of the information is now in computer-printed reports," continued Harmon. "But in the near future, we'll be able to refer to the terminal's display screen, thus minimizing paperwork."

"In addition, when a machine is brought in for repairs, we'll be able to display its maintenance schedule on the terminal screen. If it's due for work such as an oil change and lube in a few days, we'll go ahead and perform the tasks, thus saving a return trip and loss of production," he said.

Tool Keeps Tabs On Employees

(Continued from SR/39)

the operating system's software for the host computer to accept the data from the minicomputer. Instead, the minicomputer output was modified somewhat to fit the host computer operating system.

Also, there was no change in the reporting methods required of the employees, with the exception that the data be entered through the terminal instead of on paper. The same data and same sequence are used to make it easier for the employees to assimilate the functions and carry them out.

"There is much more we can do with the terminals and the minicomputer," Parker said. "When the employees become completely familiar with data entry through the terminals, it will be simple for us to ask for additional input from the shop floor. At that point, we will be able to gather data to track individual orders and monitor most orders as they move throughout the entire company."

As part of the third phase of the program, Parker will connect the system's minicomputer to the host computer. This will make both data processing systems more efficient by letting the host computer request the data from the minicomputer. There will no longer be a need for the computer to wait until an operator can mount the tape containing the input data.

Direct connection will make data in the main files of the host computer available to the people on the floor. Thus, foremen or even individual employees will be able to audit their labor reporting for periods of six days or more, or production planning people will be able to receive instantaneous status reports on any or all orders going through the plant.

Rice, for whom the system was designed, already is looking forward to phase four when reporting from remote plants will be on-line to the minicomputer.

"Data from our Marysville plant, which is 10 miles away, usually comes up by vehicle 24 hours after the shift is over," he explained.

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- 13 Erase controls
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Slow to Develop, But ...

Big Screen, 132-Column Units Setting Trend

By Ron Rader
Special to CW

Although a definite trend toward 132-column computer terminals has been slow to develop, there are signs in the marketplace that a move in the direction of full-character displays on larger screens is taking shape and that the future in terminals lies with 132-column capability on 15-in. screens.

In order to understand the trend that is foreseen and the reason it has taken so long to get started, some history is helpful.

When computer terminals were first introduced into use, they were nothing more than sophisticated electronic replacements for the old punched cards. As such, they were simply computer input devices and, like the cards they replaced, were based on an 80-column format.

As terminal technology developed, capabilities increased and terminals began to be used not only to input data to a computer, but also to retrieve, edit and rearrange it. Terminals became true communications devices with both input and output capabilities, proving themselves faster and more efficient than printers for information that was needed quickly and temporarily.

Major Problem

In this expanded use of terminals, however, one major problem became apparent. The computers to which they interfaced were programmed to output data on a 132-column format in order to accommodate the printers that had been on that format from the beginning.

In order for the computer to output data for viewing on a CRT terminal instead of to the printer for hard-copy, some rather complex and definitely time-consuming reprogramming became necessary. But even when the required changes were made the results were not very satisfactory. Operators suddenly found themselves viewing data on a screen in 80-columns that they were accustomed to seeing in print in 132-columns. The different look has led to confusion and frustration.

In an effort to resolve this problem, several terminal manufacturers developed the capability of displaying 132 columns of data on their CRT terminals, in the same form as users were accustomed to seeing in printed material. A new problem was created, however, because the same 12 in. screens that previously displayed 80 columns of characters were being utilized.

Now, 132 columns of characters were "squeezed" into the 12 in. of display area, obviously smaller and more difficult to read. With operator strain and fatigue becoming a major consideration in the use of terminals, the jamming of 132 columns of characters into a 12-in. screen is clearly a step in the opposite direction from achieving operator comfort and convenience.

The ultimate solution, which resolves all of the old problems and

points the direction for a new generation of terminals, is the use of 132 columns displayed on 15-in. screens.

One company that has sized up the problem and entered the market with a terminal designed to overcome all of the problems and limitations of other offerings is Tab Products Co.'s Electronic Office Products Division (EOP).

According to Tab's EOP Division marketing director Bob Stroh, "We decided from the beginning that the future of terminals lies with the 132 columns, 15-in. CRT terminal and

based on that decision, we committed our first terminal product to those specifications as a minimum requirement."

Although the full size screen with large, readable characters pointed the Tab designers in the direction of 15-in. CRT terminals with 132-columns capability, that was just the start.

In order to achieve the maximum in screen clarity, Tab designers also selected a full 7 by 11 dot matrix in a 9 by 14 cell rather than the 5 by 7 or 7 by 9 dot matrix used by other manu-

facturers. With this larger dot matrix/cell size combination, the screen even displays characters that require them with true descenders, and the result is a terminal with a screen of unusual brilliance and clarity, one that is easy to read and easy on the operator.

Since the 132-columns, 15-in. display terminal promises just that, it becomes highly desirable for terminal manufacturers to offer it.

In addition to the need for larger, clearer screens, Tab also sees another
(Continued on SR/44)

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normal PDP-11 operation in an RSX-11M environment.

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Broker Information Terminal System Termed

By George Fulmore
Special to CW

SAN FRANCISCO — In the competitive securities industry, the flow

of information over the past decade has accelerated at an alarming rate. And all signs point to a continued acceleration. Brokers are concerned

with more issues and the trend is to move further and further away from the emphasis on traditional stocks and bonds to an emphasis on diversified investment services, including tax shelters and various options strategies.

In short, because of the vast amounts of information required at a moment's notice, the securities industry is ripe for a computerized information inquiry system. And in San Francisco, the Sutro Group, a diversified financial services organization with 14 branch offices in California and Nevada and nearly 200 brokers, described its Broker Information Terminal System (Bits) as the securities industry's "system of the future."

Bits Goes On-Line

Designed, developed and now maintained and operated for Sutro by Computer Systems Design, Inc., also a San Francisco-based firm, Bits went on-line in February 1979, giving Sutro managers and brokers direct access — via desktop video display terminals — to a broad range of marketing and customer account information.

At Sutro, Bits is implemented on terminals provided by Quotron System, Inc. The result is that information such as current prices of stocks on the various exchanges, the Dow Jones averages and business news summaries are available from the same terminals that provide Bits information, such as the available purchasing power, current positions (holdings of stocks and bonds) and recent transactions for any customer account.

Other valuable information available from the Bits data base includes listings of a broker's customers who hold positions in specific securities,

bulletins from the firm's product line departments or its research department, Standard & Poor's stock reports for any of approximately 3,600 listed securities and even a glossary of securities-related terms.

Broker Productivity Studied

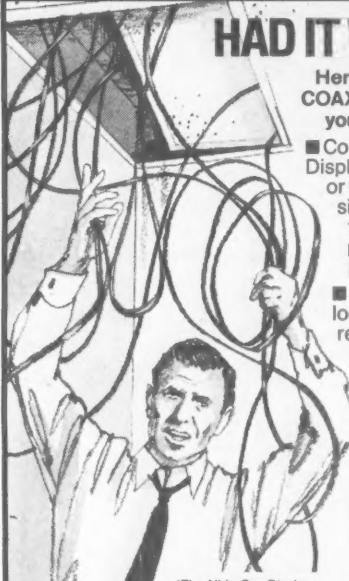
What all these inquiry functions and others add up to is improved customer service plus increased broker productivity, according to Sutro's director of planning, George H. Baldwin, who recalls the impetus to develop Bits.

"In 1977 Sutro asked our accounting firm to do a study of broker productivity," he said. "What they did was basically a time and motion study, and they discovered that the reason brokers were not more productive was that they spent a lot of time walking around, away from their desks, not talking on the phone."

"What they found brokers to be doing was walking around getting information. Based on this study, we concluded that we could achieve a substantial increase in broker productivity by bringing the information that the broker needed to the broker's workstation."

It has been two years since Bits was implemented and Baldwin reports: "We think that the underlying assumptions that we made when we created the system are more valid now than ever. This is an information-intensive business and it is going to become an even more information-intensive business. Right now our product line is so complicated that a broker can't possibly memorize everything that we can offer his client."

Integrating Bits into his daily routine — as a definite factor in his productivity as a securities broker — is



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"I Lost My Calculator."

'System of the Future' by Securities Firm

Randy V. Rosso, a Sutro vice-president. Having been at Sutro for nearly 23 years, Rosso has been in the securities industry long enough to remember the days when his job required literally "living on the phone with the margin clerks [in order to get up-to-date customer account information]." Today, however, all the customer account information he needs is as close as his Bits terminal.

Using Bits Functions

A typical day for Rosso today begins with his logging on the Bits system and receiving a list of the "Front Page News," or a list of titles for the 40 bulletins that most recently have been entered to the system's data base by one of Sutro's product-line managers or its research department.

After displaying and reading through any of these that are new to him, he then uses the Rank function to rank the usable buying power and available cash as of that day for his customers. Next, he uses the Customer Information (Cust) function to check that all previous day trades by his customers are listed as completed transactions. "If I don't find something in the customer's record of transactions that should be there, I find out why," he said.

Throughout the day, Rosso makes use of other functions, such as the commission calculator that calculates and displays commissions on a single- or multiple-execution order or the options yield calculator that calculates and displays the approximate yields from proposed options strategies.

But in addition to the various Cust functions, it is Standard and Poor's Automated Research (Spar) function that Rosso finds most valuable, especially when he gets a call from a customer who wants information on an issue about which Rosso knows few details. In such a case, he quickly brings the Spar series of displays for that issue to his screen, scanning through them to collect the information that he needs to advise the customer.

"Prior to the time Bits has been around it was a lot more cumbersome to get something like that done and took a lot more 'leg' work," he said.

"Bits saves me a tremendous amount of time and that is what productivity is all about. It also makes a broker look damn smart to a client, because all his account information and just about any information about an issue is literally at his fingertips. A client can ask you just about any question he wants, and 'bing, bing, bing,' you have the answer for him."

Tandem/16 Hardware

Computer Systems Design (CSD) senior technical consultant, Bob Fyles, was involved in the early phases of Bits development, including the installation of the Tandem/16 computer system as the system to develop and support Bits.

The current hardware configuration includes three CPUs, which have 960-, 868- and 480K bytes of memory, respectively. There are six Tandem 200M-byte disk drives and

two tape drives and the system supports approximately 400 terminals.

"Among the major factors that we were looking for when we selected the Tandem," Fyles said, "were the reliability of the hardware, the ability to upgrade the system in a modular fashion and the feature of 'fault tolerant' Tandem Nonstop processing. We wanted a system that was on-line transaction-oriented and was fast."

"Our response time for a Bits inquiry is less than two seconds now on a system that performs thousands of transactions per week plus supports a variety of systems other than Bits."

And the Nonstop feature of Tandem is all they say it is. We have had a history of excellent reliability."

But along with all the success of the system, director of planning Baldwin pointed out an irony: "We're so far ahead of everybody else that some of our own people don't know what they're sitting on," he said.

"Where we have achieved the greatest results is with brokers who come from other brokerage firms. They think it is the greatest thing since sliced bread. We know that several million dollars worth of production has come into this firm because of the Bits system."

"The next thing that we want Bits to provide is a highly sophisticated order-entry system that will eliminate all the problems the firm has now with its semiautomated system," Baldwin added.

"That's being developed right now. After that we will be able to provide our biggest customers with terminals in their homes where they can dial up Sutro through an acoustical coupler, get their own margin information and enter their own trades. That will happen within three years."

Fulmore is a technical writer with Computer Systems Design, Inc.



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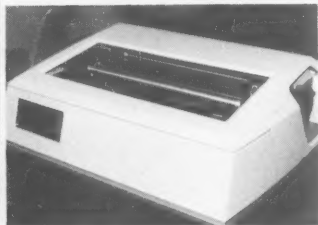
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SPECIAL REPORT

• Deflating Information Float

The Missing Link: PBX

By Desmond F. Hudson

Special to CW

"Information float" is the inability
to use information because it is some-
where between the source and the
person needing it. Information float
will be reduced in the '80s by inte-
grating the currently parallel paths
for voice, data, text and image com-
munications through office control-
lers and integrated networks, thus
improving distribution.

The growing base of remote or dis-
tributed processors and office prod-
ucts that can communicate via the
communications network suggests
that the private branch exchange
(PBX), which already controls the of-
fice voice stream, will become the in-
tegrating element in this multinode
information system. Value-added of-
fice systems designed into or about
this controller will significantly in-
crease the functional capabilities
over current PBX products, which
will represent a major additional
market opportunity.

As we move into the '80s, there has
been general recognition that the
cost of office workers and office ad-
ministration as a percent of total
company expense continues to in-
crease.

Operational and functional analysis
of the office process reveals complex
interrelationships between the vari-
ous modes (voice, data, document) in
which information is handled and the
interrelationships between office
workers who must process the infor-
mation. This indicates that to achieve
productivity improvements through
integrated office systems, these sys-
tems must be designed to accommo-
date both the functional and struc-
tural requirements of the office.

Thus, the '80s will see, among other

things, a bridging of the divergent
trends in distributed communica-
tions processing. Public standards
will result in an open systems inter-
connection. This will serve as the
high-level communications protocol
needed to allow the private data
communications protocols used by
the distributed DP industry to inter-
act with the public communications
protocols of the telecommunications
industry.

The distributed data processing sys-
tem will then become just another el-
ement of the communications net-
work, able to be accessed from any of
the voice or data terminals connected
to the network. When this occurs,
the most logical point of connection
to the network and, therefore, to all
network elements will be at the PBX
or the office controller.

Technology Trends

Most of the basic technologies re-
quired for cost effectively imple-
menting integrated office systems
are available today or will be in the
very near future (1982 to 1984). Cer-
tainly, semiconductor technology
will continue to decrease in cost and
thus application of these technol-
ogies will be critical to maximizing
product competitiveness throughout
their life cycles. Additionally, we
will see increased application of digi-
tal circuits to implement analog
functions.

Digital technology, introduced in
1975, is ideally suited to the efficient
integration of multimedia communi-
cations and office services. This tech-
nology will persist through the '80s
and cost for this technology will con-
tinue to drop, while performance
rises. Hence, leading systems design-
ers, looking to extend product life

Trend Seen Developing Toward 132-Column Units

(Continued from SR/41)

factor as having a major influence on
the trend toward 132-column, 15-in.
terminals. It is the growing use of
computer terminals in real operating
departments, outside of the DP cen-
ter.

These distributed operations are
bringing non-DP personnel into di-
rect contact with remote computer
terminals. As noncomputer-trained
personnel, they have a need to dis-
play and print more data at one time,
easily and quickly. Because of these
requirements, 80-column displays
and 132-column displays on 12-in.
screens are confusing.

In these outside situations, the ter-
minal becomes less of a DP tool and
more of a practical working tool, en-
abling rather unsophisticated per-
sonnel (in terms of DP) to gain access
to their company's computers. They
need to do so in an easy to under-
stand, easy to use manner. Such use
of terminals will be a major force in
motivating terminal manufacturers
to make use of not only 132-column

formats, but also 15-in. CRT termi-
nals.

For all of these reasons, Tab feels
quite confident of its prediction. In
summary, what they have consid-
ered are the following events and
facts:

- The evolution of data entry de-
vices from punched cards to CRT ter-
minals.
- The expanded use of terminals as
output and editing devices as well as
input tools.
- The growing use of terminals in
non-DP environments.
- The intensifying interest in oper-
ator comfort and safety.
- The demand for improved pro-
ductivity.

When all of these are taken into
consideration, it is not difficult to
understand why the Electronic Of-
fice Products Division of Tab Prod-
ucts is placing all of its chips on the
line.

Rader is marketing services manager for
Tab's Electronic Office Products Divi-
sion, Palo Alto, Calif.

•Float to be Reduced

Expected to Improve Communications Flow

cycles, will select system architectures that keep software and hardware separate to permit easy retrofitting of successive generations of devices.

The need for electronic office workstations will grow, as will the need for simplicity of use and easier network access. Lower cost, higher reliability, enhanced terminals able to handle not only voice, but also data, text and image — requiring higher bandwidths than current analog technology permits — will drive the need for digital terminals and digital distribution systems.

Processor technology coupled with new software languages, permitting significantly reduced software development costs, will become commercially available in the early '80s, further accelerating the trend to distributed, network-based intelligence.

Finally, the improved communications capability, coupled with the diminishing cost of memory and processing power, will be used to address user functional needs in a manner heretofore not economically feasible.

Market Trends

The prime market for business communications systems is essentially those firms employing 50 or more people. In the U.S. market, this is only 12% of the U.S. firms, but this 12% employs some 73% of the total U.S. workers.

According to a recent Telephony research study of some 300 large users, the key decision factors in the purchase process for large users were service, product features, technology, price, delivery and salesman's competence.

Also noteworthy in this study was the fact that for all these factors except service, the interconnect industry ranked ahead of the regulated telephone industry in terms of performance. On the service factor, 62% of those surveyed ranked telephone company service as good or better, while 59% ranked interconnect service as good or better. This indicates that on service, the interconnect industry performance is clearly approaching that of the regulated telephone industry. The main conclusion that I draw from this work is that the interconnect industry is, in fact, a mature, well-accepted industry, serving its users' needs

most satisfactorily.

Deregulation will ensure that the shift to customer-provided business communications systems will continue. This will be spurred by the fact that the telephone companies are establishing direct sales organizations.

I expect the next three to four years will be a market proving ground for so-called integrated systems and new market entrants, similar to the 1968 to 1972 period when electronics was first penetrating the PBX product line. Standards for data communi-

cations and information access systems will be developed during this period.

The 1980s will be the decade of evolution for the information society. Communications will play a crucial role in our lives, requiring increased reliability and

more friendly services. As a result, data communications will move from the world of data processing to the world of the common user.

Hudson is group vice-president, Business Communications Systems, Northern Telecom, Inc.

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A DPer's Shopping List

How to Select CRT Terminals? Some Tips

By Randal Styka
Special to CW

It was not very many years ago when the selection of a CRT terminal from among the models and manufacturers was simple. However, in the last few years there has been an astounding proliferation of models and features from many old faces as well as new companies.

The trend in the market toward greater functionality has at long last led users to being able to choose a CRT terminal for their applications, rather than structuring their applica-

tions around the terminals in use. Furthermore, advances in software portability and compatibility are allowing users to migrate to new terminals without reworking their applications software.

Determine Capabilities

First and foremost, determine the interface capabilities and code characteristics necessary. Is the terminal to be IBM-compatible or is Ascii code to be used? Is the necessary interface of coaxial cable, or is it RS-232, RS-449, or perhaps a 20 mA current

loop? Your computer vendor should be able to provide you with this information.

Secondly, we can narrow down the field by looking at the manufacturers of the equipment. Will they be around for service for many years to come? Will they have the ability to produce new, enhanced models for your upgrade needs in the future?

First list those features that are absolutely essential to you. Then list the capabilities that would be nice, but are not essential to your operations. Feel free to make a "wish list"

of everything you might possibly want in your terminal.

There are many terminals available today that have a detached keyboard. This is especially useful for people with a limited amount of room on their desks, allowing them to move the keyboard around on their desk as they desire. The CRT tube can also be angled in any way desired, independent of the location of the keyboard.

Numeric Keypad

Most terminals currently manufactured have a numeric keypad supplied as standard equipment. This is handiest when a large quantity of numbers is to be entered or if calculations are to be done using numbers and formulae that the user will enter. If calculations are to be done, make sure that the keypad has all of the keys you will need. In addition to the numeric keys, it is handy to have keys for the common arithmetic operations and for "carriage return" on the numeric keypad.

An element of personal preference is the color of the CRT screen's phosphor. Most screens are available with a green phosphor in addition to the traditional white phosphor. The green screen can be easier on the eyes. Amber screens are also becoming more common.

Location of Keys

Study the location of the return key, break key and the various special character keys. If you have terminals currently with the return key to the right of the "ASDF" row of keys on the keyboard, be wary of a change to a terminal with the return key to the right of the space bar, or in some other location. If your computer responds to the break key, make sure it is not in a location where it might be accidentally depressed. Similarly, if the backspace or delete keys are needed, make sure they are easy to access and that they do not require a shift key to be depressed to operate.

Many keyboards have a very light touch that might be fine for touch typists but will cause great difficulties for another user. The size and spacing of the keys should also be considered. There is absolutely no substitute for a trial period by office personnel.

Many software packages make use of special function keys on the keyboard. Soft keys are a relatively new idea, but can be very beneficial. This capability allows the labels for the functions of the special function keys to be displayed on the CRT screen and updated by the applications software as appropriate. This makes it easier to train new users and also simplifies the user's ongoing use of the terminal.

Many of the newest CRT terminals support the display of as many as 132 columns of information. This allows the display of up to 24 lines of a standard printout on the screen, a very useful aid in program debugging. A slow scrolling capability that allows data to move up the screen at a read-

(Continued on SR/48)



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Executive Offers Advice

On Selecting Terminals

(Continued from SR/46)

able rate can be helpful. The newest CRT terminals allow the rate of the scrolling to be varied to suit an individual user's preference, another aesthetic benefit.

Study the programming capabilities of each CRT terminal. Are the ones you are considering compatible with your software? Block mode, page-at-a-time transmission, as well as line-at-a-time and the standard single character transmission capabilities are available. The more sophisticated modes are helpful in taking a load off of your CPU and transmission lines if your software will support such an operation.

Make sure the control codes needed to control the screen, including all of the video display attributes you will be using, are clearly documented and that they can be easily generated by your computer system.

Types of Graphics

Many CRT terminals support limited graphics or comprehensive graphics. They often have capabilities to generate other character sets and to display graphics that are very difficult to program and thus seldom used. Make sure your programmers are happy with the way these features will be programmed before you buy the terminal.

If you will be running a plotter or printer with the terminal, determine if each terminal has a printer port. These vary by the amount of software control over their operations and the buffering control that you have. Make sure your selected CRT will work well with the other peripheral, without losing any data.

Another way in which terminals vary is the method with which you specify the various settings for the communications port (including the bit/sec rate), the screen characteristics and the like. Traditionally, CRT terminals have used very small "DIP" switches to control their operation. This might be a problem if you need to change some of the settings frequently. If the terminal you are looking at has these switches and you may need to change them regularly, study where they are located. Make sure they are as accessible as they will need to be.

Many of the newest terminals use a "soft" setup mode instead of the switches. This allows all of the settings to be altered directly through the keyboard of the terminal, a tremendous advantage when these changes are made frequently. On some of the CRTs with a soft setup mode, the user must know the meaning of different codes or must look at a chart to alter the settings. The newest terminals display the names of the functions as they are altered, or they use a menu to simplify terminal setup.

Does the terminal support the bit/sec rates you will use? What about parity generation? Does it check incoming parity or merely generate outgoing parity? Will it work with the type of modem you may be using? Are the visual capabilities such as a light screen on a dark background vs. a dark on light portrayal, screen intensity, character blinking, underlining and the like adequate for you?

Emulation

Many of the newer terminals emulate terminals from other manufacturers. If you need this capability, is it easy to select the emulation mode desired? Verify that emulation is 100%, or that you can get by without the features that are not emulated.

What are the physical characteristics of the unit? Does it have a tilt screen? Is it constructed well for your application? The need for durable construction is stronger for terminals in industrial environments and for use in schools, or other heavy use environments. Is the terminal small enough to fit on the users' desks? Once again, there is no substitute for an on-site trial unit.

The most important thing to do when considering a terminal purchase is to know what you are looking for. Don't let a salesman talk you into features you don't need or talk you out of features that you do need. Be prepared by making a features list before you contact the salesman, using the features discussed in this article as a guide. Then you can control rather than be controlled by your negotiations.

Slyka is president of Computronics, Inc., Wood Dale, Ill.



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INTRODUCTION TO DATA COMMUNICATIONS	Boston	Oct 21-23
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	New York	Nov 4-6
	Los Angeles	Nov 4-6
	Washington	Nov 18-20
	San Francisco	Dec 2-4
	Atlanta	Dec 2-4
	Dallas	Dec 2-4
	Denver	Dec 7-9
DATA COMMUNICATIONS NETWORK COMPONENTS	San Francisco	Oct 14-16
	Washington	Nov 16-18
NETWORK DESIGN I	Washington	Oct 21-23
NETWORK MANAGEMENT	New York	Oct 21-23
	San Francisco	Nov 4-6
	Chicago	Dec 16-18
CORPORATE NETWORK ARCHITECTURES	San Francisco	Oct 28-30
	Washington	Nov 4-6
BUSINESS TELECOMM. I	New York	Oct 6-8
	Boston	Nov 2-4
	San Francisco	Nov 16-18
	Chicago	Dec 2-4
INTRODUCTION TO INTERNATIONAL TELECOMM.	New York	Oct 7-9
	Los Angeles	Dec 9-11
SYSTEMS NETWORK ARCHITECTURE	New York	Oct 14-16
	San Francisco	Nov 4-6
	Boston	Nov 18-20
	Chicago	Dec 9-11
LOCAL AREA NETWORKS	Chicago	Oct 14-16
	New York	Nov 18-20
	San Francisco	Dec 16-18
COMMUNICATION TECHNOLOGY TRENDS 1-DAY BRIEFING	Chicago	Oct 23
	Washington	Oct 30
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CHICAGO — A multimillion-dollar teller system renovation project, begun this year by First Federal of Chicago's largest savings and loan, is already beginning to benefit the institution and its customers.

Only part way through the first year of its projected two-year renovation project, which carries an estimated \$2 million to \$3 million price tag, First Federal is finding the new computer system increases customer service while being less expensive to purchase and operate.

"Our customers are receiving better, faster service because with the less expensive terminals we can now give each teller an individual computer display instead of having two tellers share one display," First Federal Vice-President Gerald F. Waldron said. "Now two teller stations can process customer transactions concurrently instead of alternately."

Combinations Installed

Waldron said the \$3.4 billion financial institution has installed combinations of the "more reliable and less expensive" IBM 3604 teller terminals and 3616 financial printers in 40 teller stations at 12 of its offices in and around Chicago. He added that by the end of 1981 the new system would be installed in more than 400 teller stations at 42 First Federal offices in Cook and DuPage counties.

"This is a major project for us," he said. "From an operational viewpoint it is the biggest thing we have ever done."

Waldron also noted that the "modular concept" allowed by the new system — the ability to mix and match equipment to meet the needs of individual teller stations — was rapidly gaining support from S&Ls around the country because of its flexibility.

"It's a concept that most S&Ls have or will go to and one that allows us to better structure the service we provide to our customers," he said.

A further benefit of the system to the institution and its depositors is its ability to store records of financial transactions at branch office sites if the main computer or telephone lines go down. This means customers

continue to receive complete, up-to-the-minute account records and service without having to wait or return at another date.

While First Federal's customer service will be enhanced by the new teller system, Waldron noted it will be improved even more when the S&L begins installing its 50 new IBM automated teller machines. The 24-hour banking machines will be installed at all First Federal offices to provide full-time banking services.

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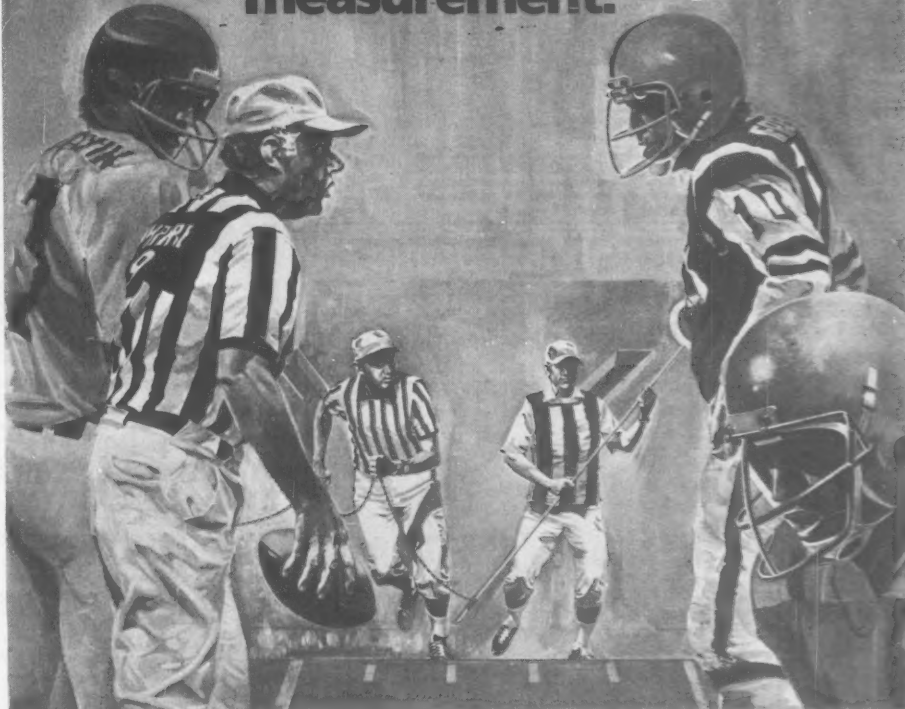
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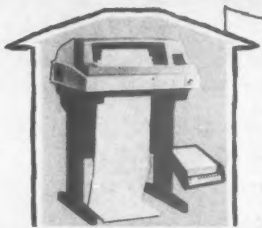
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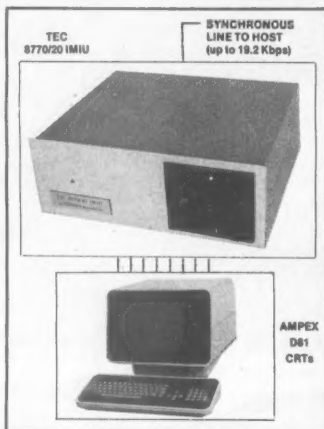
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SPECIAL REPORT

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or 800-538-1634

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National sales/leasing company for data communications terminals • 6011 Executive Boulevard, Rockville, MD 20852 • 301-770-1150

ALPHACOM INC
2323 South Bascom Avenue, Campbell, CA 95008 • 408-959-8000

AMERICAN COMPUTER GROUP/AMERICAN USED COMPUTER
National sales/leasing company for new/refurbished data communications terminals • P.O. Box 68, Kenmore Station, 712 Beacon Street, Boston, MA 02215 • 617-437-1100

ANADEX INC
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ANDERSON JACOBSON (AJ)
521 Charcot Avenue, San Jose, CA 95131 • 408-263-8520

AT&T/BELL TELEPHONE COMPANY
Local AT&T Telephone offices
(rental of data communications terminals produced by other AT&T subsidiaries)

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5932 San Fernando Road, Glendale, CA 91202 • 213-245-8244

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4910 Amelia Earhart Drive, P.O. Box 25668, Salt Lake City, UT 84125 • 801-355-6000

BRAEGEN CORPORATION
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BURROUGHS CORPORATION
Burroughs Place, Detroit, MI 48232 • 313-972-7000

CAL DATACOM INC
1844 Carnegie Avenue, Santa Ana, CA 92705 • 714-540-8553

CARTERPHONE COMMUNICATIONS CORP/Cable & Wireless Company
National sales/leasing/service company for data and message communications terminals • 1111 West Mockingbird Lane, Dallas, TX 75247 • 214-630-9700
CENTRONICS DATA COMPUTER
Hudson, NH 03051 • 603-833-0111

COMDATA CORPORATION
National sales/leasing company for data communications terminals incorporating ComData modems or acoustic couplers • 79 North Nagle Avenue, Morton Grove, IL 60053 • 312-470-9600

COMPUTER DEVICES INC (CDI)
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COMPUTER MAINTENANCE CORP
National sales company for data communications terminals • 22 Fifth Street, Stamford, CT 06905 • 203-325-3514

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DATA ACCESS SYSTEMS (DAS)
National sales company for data communications terminals • Coles Road & Camden Avenue, P.O. Box 1230, Blackwood, NJ 08012 • 609-228-0700

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DATAROYAL INC
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EASTERN TERMINALS & COMMUNICATIONS, INC
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1133 Westchester Avenue, White Plains, NY 10604 • 914-886-1900

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INFORMATION TECHNOLOGY INC (ITI)
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KALBRO COMPUTER SALES/ICE
National sales/leasing company for data communications terminals • 722 North Church Road, Elmhurst, IL 60126 • 312-279-1880

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National sales/leasing company for data communications terminals • 285 Madison Avenue, New York, NY 10017 • 212-889-3888

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National sales/leasing company for data terminals • 20710 Manhattan Place, Suite 100, Torrance, CA 90501 • 213-328-7460

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National sales company for data communications terminals • 9300 Boardwalk Avenue, San Marcos, CA 92069 • 714-744-8305

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Buffered Models Join Bell 43 Line

NEW YORK — AT&T has added two buffered models to its 43 family of teleprinters for message transmission over the public switched network or private-line networks.

The Models 43BSR (buffered send/receive) and 43BSC (buffered selective calling) allow off-line message preparation prior to and during transmitting and receiving, along with storage of transmitted messages, the vendor said.

The 43BSR utilizes Ascii code for batch and conversational data communications on a dial-up or two-point private line system. The 43BSC is designed for multipoint private line systems and uses either eight-level Ascii or five-level Baudot code.

The 43BSR costs \$160 on a month-to-month plan and \$135 on a one-year lease plan. The 43BSC costs \$165 month-to-month and \$140 on the one-year plan.

NCR Comten Aids Rate Performance

ST. PAUL, Minn. — NCR Comten, Inc. has unveiled three new and two enhanced performance measurement products:

- The Measurement Technology for IBM 3705-II communications controllers is a procedural product that enables users to collect, report and interpret performance data about key performance aspects of the IBM 3705-II using NCR Comten's Dynaprobe hardware monitoring equipment. It licenses for \$600 the first year and \$125 for each succeeding year.

- The Dynaprobe D-5011 Measurement Tailgate Adapter is an accessory that facilitates the performance measurement of IBM 3032 and 3033 computer systems. It costs \$2,500.

- The D-8028A Data Handler with Event-Triggered Trace is an enhanced version of the D-8028 Data Handler. It has the functional capabilities of the D-8028 and adds the capability to allow continuous storing of data in the D-8028A internal storage until a user-specified event occurs. Its price begins at \$32,000, according to the vendor.

- The Performance Release 3.0 is a licensed software product that provides complete data reduction and reporting facilities for performance measurement

(Continued on Page 50)

3Com Fits DEC Processors Into Ethernet Local Nets

MOUNTAIN VIEW, Calif. — 3Com Corp. has unveiled Ethernet local network controllers that plug into Digital Equipment Corp. processors ranging from the low-end LSI-11 microcomputer to the VAX-11 supermini.

The 3C200 controller is compatible with DEC's LSI-11 Q-bus; the 3C300 controller was designed for DEC's Unibus. The two products provide Ethernet controller functions at 10M bit/sec for DEC systems, according to the vendor.

3Com also announced enhancements to its Unix networking software, Unet, which provides full support for the two new Ethernet controllers.

Teamed with a 3Com 3C100 Ethernet transceiver, either controller is said to provide support for layers one (physical) and two (data link) of the International Standards Organization (ISO) Open System Interconnect reference model.

Furthermore, a DEC computer running the Unix operating system, equipped with 3Com's enhanced Unet, new controller and transceiver, can become a complete Ethernet local computer network station, the vendor said.

Such a system provides communication through all seven levels of the ISO model, with Unet providing file transfer, virtual terminal, electronic mail transfer and process-to-process communication capabilities via the five upper layers.

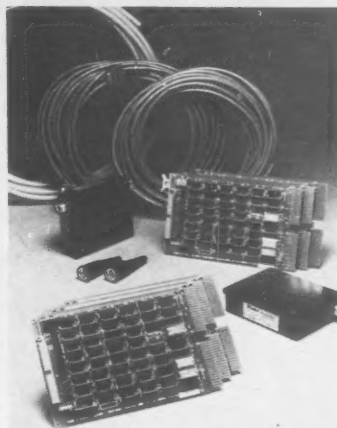
Dual-Portioned RAM

The 3C200 and the 3C300 controllers have 32K bytes of dual-portioned random-access memory (RAM) that permits both the controller and the host CPU to access the controller memory space.

To support back-to-back handling of packets at the 10M bit/sec transfer rate, a portion of the 32K-byte memory is used by the controller for send and receive buffers. It is allocated in 2K-byte segments, each of which has enough space to store the maximum allowable packet size of 12,144 bits.

Since most Ethernet applications require no more than four buffers, much of the memory can be used for storing programs or data.

The CPU host can process packets within this memory, thereby minimizing move operations; the packet processing occurs



The 3C240 Q-bus Ethernet Starter Package from 3Com Corp. contains the hardware for a full, two-station Ethernet-based local computer network.

concurrently with the Ethernet transmission activities of the controller.

On a practical basis, the user gets not only an Ethernet controller, but also an additional 24K bytes of memory.

The 3C200 is contained on three double-height modules and is plug compatible with DEC Q-bus computers including the LSI-11, LSI-11/2, LSI-11/23, PDP-11/03 and PDP-11/23. For this controller, the vendor provides software drivers for the RT-11 and RSX-11 operating systems as well as Unet, the networking software for Unix.

DEC Unibus computers use the single, hex-sized module 3C300. It is compatible with the PDP-11 Unibus machines, including VAX. 3Com provides software drivers for VMS, RSX-11 and RT-11 operating systems and Unet for use with the 3C300. It differs from the 3C200 in that it provides hardware address recognition.

The 3C200 Q-bus Ethernet Controller is priced at \$2,500 and will be available in November.

The 3C300 costs \$3,000 and will be available in January, 3Com said from 1390 Shorebird Way, Mountain View, Calif. 94043.

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Compatible With DG Series Datamedia Offers 132-Column Units

PENNSAUKEN, N.J. — Datamedia Corp. has introduced a line of 132-column terminals that are fully compatible with Data General Corp.'s Dasher 100, 200 and 280C and DG's 6052/6053 display series.

Datamedia's Excel 70 terminals are available in both monochromatic and eight-color versions and are said to

offer a number of editing features not presently available on DG's terminals. These features include: insert/delete line, erase end of screen, lock/unlock keyboard, a foreground/background mode and a secure field.

The Excel 70 terminals also offer bidirectional scrolling, split screen/regional scroll-

ing and a special set up mode that allows operating parameters to be changed from the keyboard, a spokesman said.

Variable Columns

The terminals display either 80- or 132-columns, selectable at the keyboard, and can present characters in a variety of sizes and pitches. In addition, business graph-

ics symbols are standard with each unit's 128 Ascii character set, the spokesman noted.

Prices for the terminals start at \$1,395 for the monochromatic models and \$3,195 for the color versions, the vendor said.

Datamedia is located at 7401 Central Highway, Pennsauken, N.J. 08109.

MQI Units Rival Burroughs'

FOUNTAIN VALLEY, Calif. — A terminal said to be a low-cost alternative to the Burroughs Corp. TD830 and MT983 terminals has been announced by MQI Computer Products, Inc.

The Autopoll B83 features 2K-byte memory that connects to a background printer addressed from the computer or from the keyboard of the terminal, while group poll selection provides two addresses, one in group mode and one in individual, the vendor said.

Keyboard switching from asynchronous to synchronous mode facilitates easy interchange of terminals between a remote site and the host site, requiring no hardware changes to achieve switching, the vendor claimed.

The Autopoll B83 is priced at \$1,895 from MQI Computer Products, 2615 Miller Ave., Mountain View, Calif. 94041.

Sweda Adds POS Devices

HOLLYWOOD, Fla. — A series of in-store programmable, flexible point-of-sale (POS) devices for small- to medium-size stores is available from Sweda International.

The 7610 POS terminal stands alone intelligently and can be used in network configurations that communicate to an in-store consolidator or with peripheral support in a full system, the vendor said.

Using the terminal, a store manager can get a complete report from any of 15 registers in a store by plugging in a key.

The 7601 POS terminal costs \$3,500 from Sweda at 34 Maple Ave., Pine Brook, N.J. 07058.

DEC Units On Ethernet

(Continued from Page 49)
data. It licenses for \$2,904 yearly or \$264/mo.

• The Dynaprobe D-8016A Monitor is an enhanced version of the D-8016 Monitor. A high-performance, compact hardware monitor that performs real-time measurement of digital computer systems and subsystems has a starting price of \$24,000, the firm said.

NCR Comten is headquartered at 2700 Snelling Ave. N., St. Paul, Minn. 55113.

ASCII



3270

Datastream gives you the best of both worlds.

The concept of ASCII terminals operating effectively and economically in the world of 3270 isn't new to Datastream but it may be new to you.

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- And now you can eliminate the need for two cluster controllers when access to two hosts (or two lines on one host) is required.



Here's How.

The Datastream T7 appears to the host as a 3271 cluster controller that communicates point to point or on a multi-drop leased line at data rates up to 9600 bit/s. Your ASCII terminals act as IBM 3277 or 3278's offering you the benefits of full screen 3270 functions including insert/delete, PF functions 1 through 24 and cursor select. You can even operate different types of ASCII terminals, in any mix, concurrently through the T7. Furthermore,

ASCII terminals can be locally attached or may dial-in through auto-answer asynchronous modems. And with a second optional BSC port, your operators can access multiple hosts. Best of all, with cassette-based software and a user configuration facility, your upgrades and reconfiguration are easy.

Get the most from your host.

There are lots more reasons why the Datastream T7 can help you get the most from your 3270 host. We'd be delighted to show you the rest. Just call us at (408) 727-2980 and ask for a personal demonstration or the name of the Datastream representative in your area. Or write to us:

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1115 Space Park Drive,
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Our intermediate peripheral subsystems will give you needed balance. The STC 4500 family of tape drives, for example, offers 6250 BPI

performance and speeds to 125 ips. Besides packing up to seven times as much data on a reel as conventional drives, speeds and densities can be upgraded at your site for maximum flexibility.

More innovative technology is displayed in the STC 8000 series disk drive family. Four drives, each offering distinct capacity, speed and cost advantages are available. And, with exclusive STC options such as dual port and media interchange, disk storage can be precisely balanced to achieve optimum system productivity.

Rounding out the STC intermediate products line is the STC/Documation IMPACT 4305/15...a 1500 LPM printer that's faster and easier to operate than any of its competitors.

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Datalyzer Enhanced

LARGO, Fla. — Paradyne Corp. has unveiled an enhanced version of its Datalyzer performance measurement system for terminals, mainframes and other devices in data communications networks.

The Datalyzer was designed to run with the vendor's Analysis 4420 and 4430 data communications network control systems. It features a color CRT terminal and software.

Datalyzer monitors host computer data traffic, counts events, measures response time and reports results to the Analysis system for further processing and display.

Datalyzer costs \$105,000; Analysis 4420 costs \$75,000, Paradyne said from 8550 Ulmerton Road, Largo, Fla. 33540.

General Datacomm Announces Three Modems and a Multiplexer

DANBURY, Conn. — General Datacomm Industries, Inc. has unveiled three modems and a multiplexer.

The 9,600 bit/sec Model 9604 combined with a 4-channel time division multiplexer was designed for full-duplex point-to-point data transmission over 4-wire private lines. It also operates on unconditioned Type 3002

private lines.

It costs \$4,200.

The Datacomm 202T modem is Bell 202T-compatible and provides asynchronous full- or half-duplex operation at rates between 1,200- and 1,800 bit/sec over voice grade circuits. An optional asynchronous bit/sec reverse channel provides primary supervision and circuit assis-

tance.

It costs \$395.

The Datacomm 201C modem runs at 2,400 bit/sec over unconditioned voice grade lines. Compatible with all Bell 201C/LIC modems, the modem is designed for either switched network or private line operations. In private line modes it operates in point-to-point or multipoint applications. In switched network modes the unit will operate over terrestrial or half- and full-hop satellite circuits.

It costs \$1,377.

The TDM 1209 comes as a 2- or 4-channel char. interleaved time division multiplexer. It is particularly suited to the local distribution of asynchronous terminals that home in on a minicomputer data base.

Its capabilities include full-duplex simultaneous data on every channel, aggregate data rates of 150- to 9,600 bit/sec asynchronous, 100% multiplexing efficiency, three full-duplex in-band controls per channel and built-in comprehensive sequenced diagnostics.

It costs \$595 in the 2-channel version and \$795 in the 4-channel version, General Datacomm said from One Kennedy Ave., Danbury, Conn. 06810.

LA 120 Gains Graphics Board

SANTA CLARA, Calif. — Selanar Corp. has announced the SG120R, a circuit board that reportedly adds graphics capabilities to a Digital Equipment Corp. LA120 terminal.

The board plugs directly into the DEC LA120 and does not affect I/O circuitry. The maximum input rate is 9,600 bit/in. and the average printing rate is 752 graphics col/sec. The unit also comes with a speed enhancement feature that allows the printing head to skip over blank areas. The board costs \$600, the vendor said from 437-A Aldo Ave., Santa Clara, Calif. 95050.

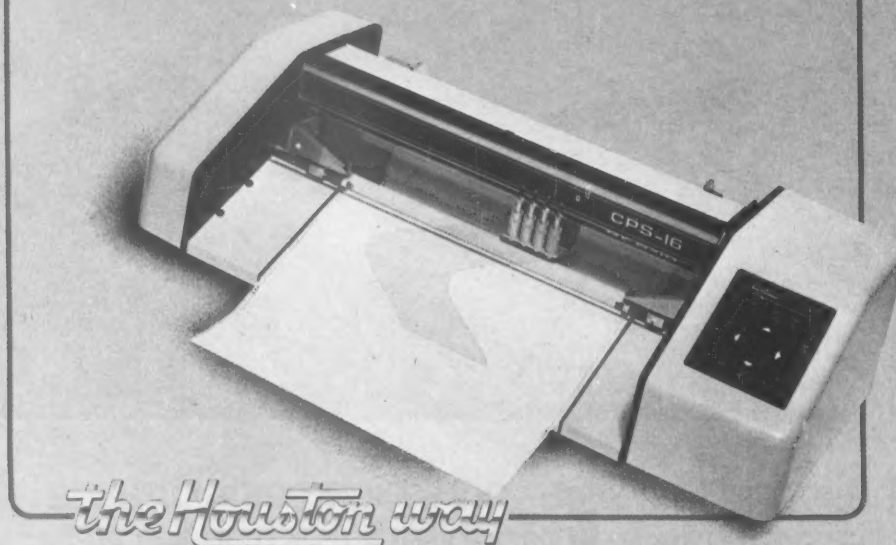
Touch Option Fits VT100

NEWTONVILLE, Mass. — Interaction Systems, Inc. has announced a touch-sensitive CRT option for the Digital Equipment Corp. VT100 video display terminal.

The Model TK-2100 is said to complement the double-height, double-width character feature of the VT100, resulting in a display suited for menu selection applications. The TK-2100 costs \$945 from the firm at 24 Munroe St., Newtonville, Mass. 02160.

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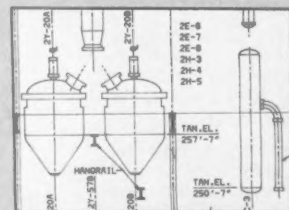
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Gandalf Multiplexer Works As X.25 Network Interface

WHEELING, Ill. — An X.25 network interface multiplexer is available from Gandalf Data, Inc.

The PIN 9102 is an asynchronous model and was recently certified for the Telenet public data network in the U.S. and the PSS network in the UK. It is also certified for the Datapac network in Canada.

The product is machine independent. Interactive terminals connected anywhere on the network communicate with the host computers via logic channels that are demultiplexed by the PIN 9102, the vendor said.

It can be configured in an 8-channel stand-alone version or in increments up to 16 channels per rack-mount configuration.

The 8-channel version costs \$4,500 and the 16-channel version \$16,000, Gandalf said from 1019 S. Noel, Wheeling, Ill. 60090.

Modem Runs On Long Hauls

CHAMPAIGN, Ill. — A long-haul modem designed to run with the vendor's statistical multiplexers and related devices is available from Compre Comm, Inc.

The Model LH-96 features switch-selectable speeds of 4,800-, 7,200- and 9,600K bit/sec and is said to provide advanced performance in full-duplex, point-to-point applications over nonconditioned lines.

The modem features CMOS-LSI implementation, including advanced QAM modulation, equalization techniques and phase jitter compensation. Diagnostics can be from data terminal equipment or by front panel switches, with the operator commanding local or remote digital and analog loopbacks.

The price for the LH-96 is \$300. Compre Comm can be reached at 3200 N. Farber Drive, P.O. Box 3570, Champaign, Ill. 61820.

Modem Fits Bell Standards

CHATSWORTH, Calif. — Phalo/OSD Corp. has unveiled a 5MHz wideband synchronous data set designed to be plug-compatible with the Bell 306 data set standards.

The Model ODS-306 may be used for high-speed serial synchronous communications between computers, as a communications link for the IBM remote 3274 control unit to repeaterless distances to five kilometers and as an alternative communications medium for the Bell 303 data set.

The data set is claimed to be the fastest communications set available for full-duplex, serial binary synchronous data transmission at speeds up to 5M bit/sec. It is a universal data set that can operate over standard internally clocked rates of 40-, 57-, 130-, 460K bit/sec and 5M bit/sec.

The rack-mount version costs \$900, while a stand-alone model costs \$1,000, Phalo said from 9240 Deering Ave., Chatsworth, Calif. 91311.

Multiplexer Runs Four Channels

WHEELING, Ill. — A bit-interleaved time division multiplexer that is designed to transfer large amounts of block data over a fixed link with a fan-out at both ends has been unveiled by Gandalf Data, Inc.

The GLM 504 synchronous multiplexer permits up to four channels of data to share a common transmission facility, reportedly replacing more expensive multiple synchronous modem costs and line charges.

With the unit, users can control their data rates. The multiplexer also has a series of thumbwheel switches behind its front cover that can be adjusted to add new terminals.

Compatible with any synchronous modem, the unit fits into new or existing communications systems and features individual channel speeds spaced out in switch-selectable fractions of the composite link rate.

It also can reportedly transfer interface control signals for all channels; has an eight-bit buffer; has an externally clocked composite link operation of 56K bit/sec.; is transparent to data; has local loopback and remote test modes for system troubleshooting; and has a point-to-point, pyramid network capability.

The device also meets EIA RS-232C and CCITT V.24/V.28 specifications.

The GLM 504 is priced from \$1,550 and is available from Gandalf at 1019 S. Noel, Wheeling, Ill. 60090.

IDS Tester Works in Field

LINCOLN, R.I. — A multifunction data communications tester designed for field service use has been announced by International Data Sciences, Inc. (IDS).

The Hawk 4020 performs interactive troubleshooting and passive monitoring of serial data associated with the EIA RS-232 digital interface. Data traffic is displayed on a one-line, 20-char. alphanumeric readout.

The Hawk 4020 costs \$3,595 with 90-day delivery from the firm at 7 Wellington Road, Lincoln, R.I. 02865.

Terminal Boasts Expandable Memory

NORCROSS, Ga. — Omega Data Peripherals, Inc. has announced an intelligent terminal with eight standard pages of memory that is expandable to 16 pages.

The MX-700 terminal can be used in either a full-screen or split-screen mode. Features include a 96-Ascii character set with descenders plus a 32-line drawing graphics symbols set, the vendor said.

The terminals are equipped with an Intel Corp. 8085 microprocessor with direct memory access and 32K bytes of random-access memory and cost \$2,195 each, the vendor said from 4357 Park Drive, Norcross, Ga. 30093.

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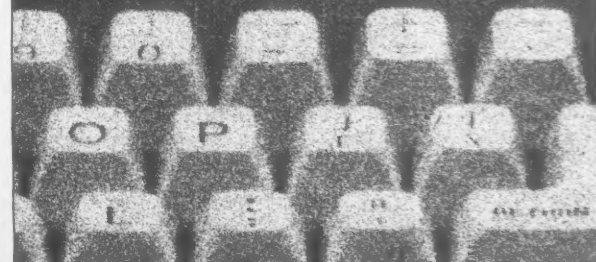
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New York	WOR*	9	Sat	9:30 AM
Los Angeles	KWHY	22	Sat	12:00 Noon
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San Francisco	KTSF	26	Sat	9:30 AM
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Philadelphia	WTAF	29	Mon	10:30 PM
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Boston	WLVI	56	Sat	11:30 AM
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Dallas/Ft. Worth	KNBN	33	Tues	6:30 PM & 7:30 AM
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There's a lot that's new this fall on "Computerworld," including new graphics, new features, new talent, new format and new stations. Check the station list every week to see if we've changed time or station in your area. And, if you don't live within viewing range of our network, you may now be able to get us on cable, on WOR, which can be seen in more than five million cable homes around the country.



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Racal-Milgo Adds Datacryptor II

MIAMI — Racal-Milgo, Inc. has introduced a commercial application of public key cryptography for key management in a data encryption device.

The Datacryptor II prevents unauthorized access to transmitted data by enciphering and deciphering at rates up to 9,600 bit/sec, the vendor said.

The public key technique uses two keys (encryption and decryption) and allows the encryption key to be made public without compromising the secrecy of the decryption key.

Terminal Offers Buffered Editing

EL SEGUNDO, Calif. — A CRT terminal featuring a buffered editing system that operates in either conversational or block mode is available from Ampex Corp.

The Model D81 alphanumeric keyboard employs an IBM Selectric type-writer-like layout. The keyboard is equipped with fast repeat keys that enable rapid data entry and a numeric pad section. The unit accentuates operator comfort with a nonglare display and nonglare key tops that ease eye strain.

Two 1,920-char. pages are provided as standard along with several editing features: erase, insert and delete character and line functions.

The basic price for the D81 is \$1,249

Docutel 2300 ATMs

Talk to System/34

DALLAS — Docutel Corp. announced an option that allows its Total Teller 2300 series automated teller machines (ATM) to communicate with IBM System/34 computers.

The feature consists of additional computer hardware and software resident in the 2300 series that cause the ATMs to emulate IBM 5251 workstations.

The option is priced at \$2,200/ATM from Docutel Corp., P.O. Box 222306, Dallas, Texas 75222.

Penril Unveils Data Encryptor

ROCKVILLE, Md. — Penril Corp. has announced a data encryptor said to operate with up to 16M bit/sec synchronous modem and terminal combination.

The Model 8007 reportedly incorporates the National Bureau of

Standards-approved algorithm using a single-bit cipher feedback.

Featuring an internal rechargeable battery and security keylock, the encryptor costs \$1,495 from Penril, 5520 Randolph Road, Rockville, Md. 20852.

Public key cryptography eliminates the need for distributing master keys by mail or courier to remote sites,

thereby eliminating exposure of master keys to unauthorized personnel.

The Datacryptor II is available in a master model costing \$2,350 and a remote model costing \$2,100, Racal-Milgo said from 8600 N.W. 41st St., Miami, Fla. 33166.

from Ampex at 200 N. Nash St., El Segundo, Calif. 90245.

Osborne 1 Gets Communications

HAYWARD, Calif. — Osborne Computer Corp. is offering communications software and disk storage for its Osborne 1 computer.

The Micro-Link software was designed for novice computer users and supports communications with bulletin boards, information retrieval services, as well as send and receive files from other computers. The introductory software uses the RS-232 port on the Osborne 1 with a standard modem.

The software supports originate and answer mode, full- and half-duplex and operates at 300 bit/sec.

The software costs \$89 from Osborne at 26500 Corporate Ave., Hayward, Calif. 94545.

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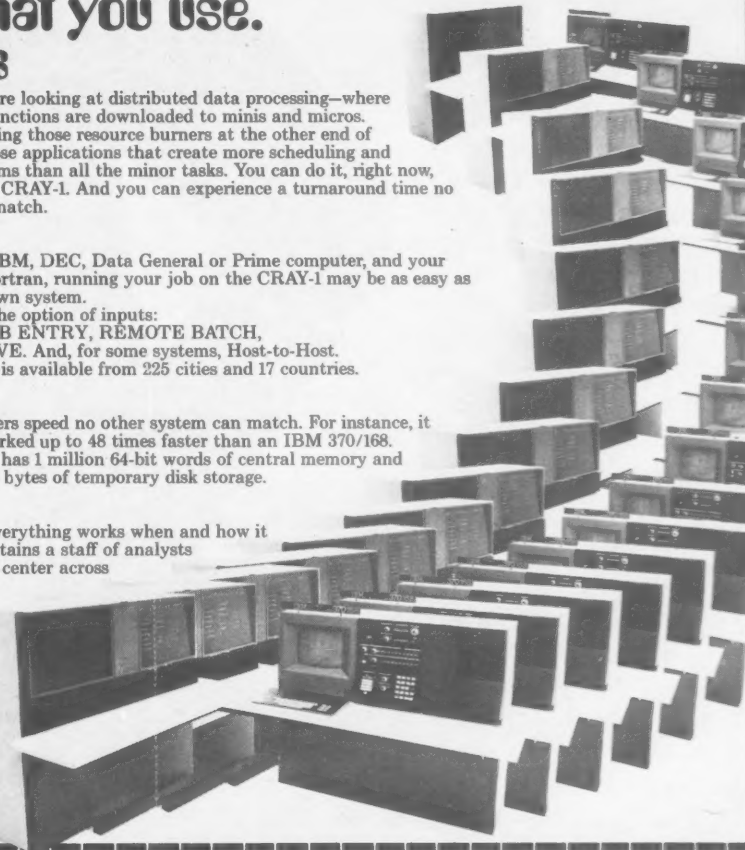
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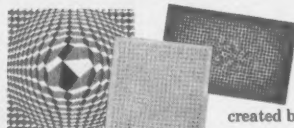
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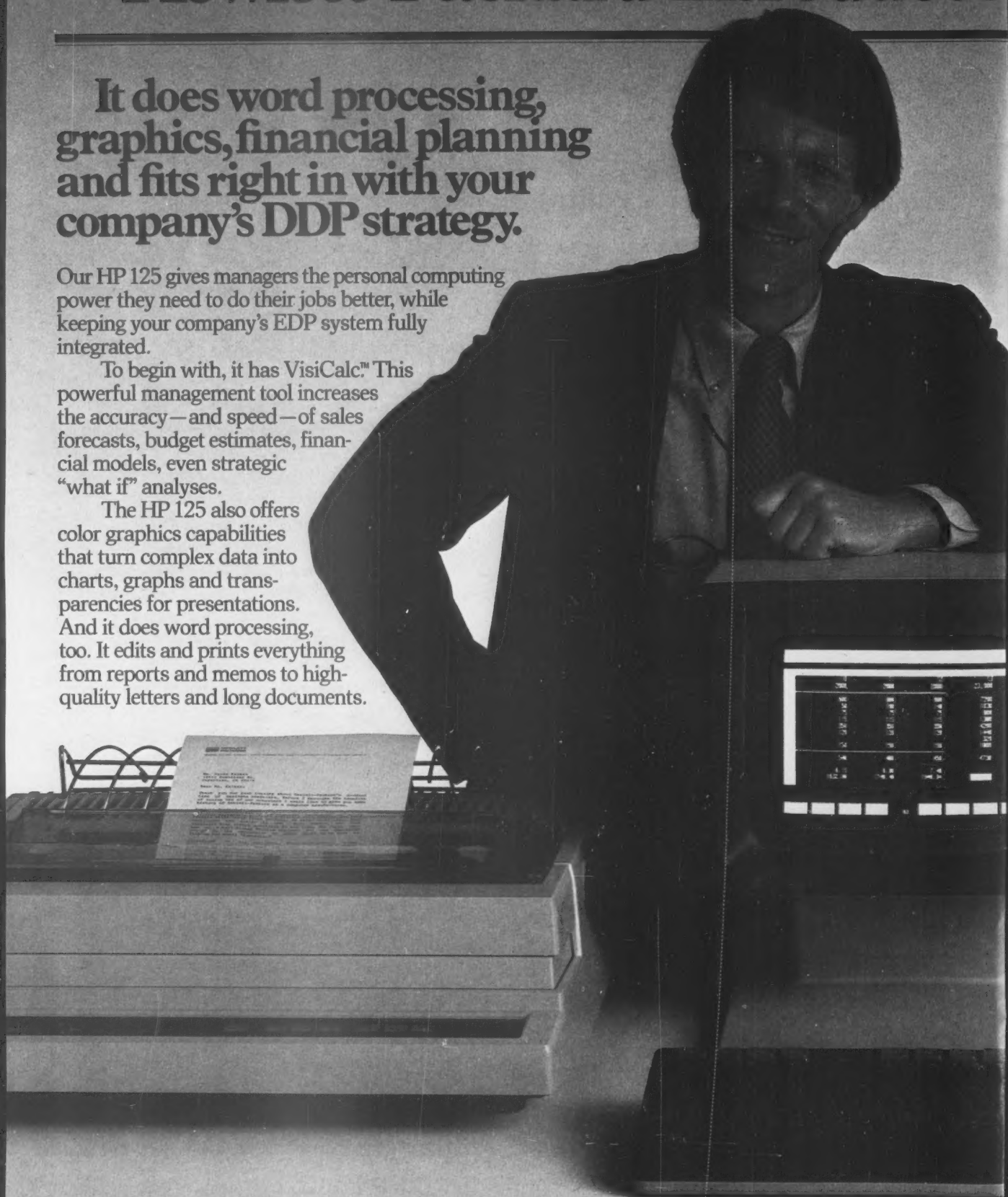
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And Streamer Tape for Q-Bus Backup

Plessey Adds Communications Subsystem

IRVINE, Calif. — Plessey Peripheral Systems, Inc. has entered the distributed data processing market with a Unibus Communications Subsystem (UCS) and has announced a streamer tape as backup for Q-bus disk systems.

The Z80A-based UCS — a general-purpose front-end communications processor — is available on all Plessey's Syst-13, 23 (Digital Equipment Corp. LSI-11/23-based) and Syst-34, 44 (DEC PDP-11-based) systems. The UCS, said to reduce processor load, is a single-hexwide microprocessor that plugs directly into a standard unibus SPC slot.

UCS provides 32K bytes of read-only memory addressing and 4K bytes of dynamic random-access memory buffering. UCS costs between \$9,000 and \$12,000, depending on protocol, memory expansion and terminal I/O controller ports, the vendor said.

The PM-CSV11A ¼-in. streaming-tape cartridge subsystem, originally developed to fit Plessey's Syst-23VTJ

computer system, fits a standard 8-in. floppy drive enclosure. The unit is said to provide backup for a 28M-byte, 8-in. Winchester-type drive in

the Syst-23VTJ configuration. The unit costs \$3,600 from the firm at 1691 Browning Ave., Irvine, Calif. 92714.

Analyzer Monitors Serial Data, Measures Network Performance

ALEXANDRIA, Va. — A data communications analyzer said to monitor serial data and provide protocol diagnostics, network performance measurements and traffic analysis has been developed by Atlantic Research Corp.

Interview 3900 was designed to fill the gap between, and feature aspects of, the Interview 3500 Data Communication Analyzer and Selective Data Recorder and the Interview 4500 Interactive Test System.

The monitor has three new features: prompt messages advise the operator of errors and other events and suggest solutions, up to 100 tests may be stored on a tape and the data

and test program used can be printed out on any Ascii printer, the vendor said.

Interview 3900 costs \$13,300 from the firm at 5390 Cherokee Ave., Alexandria, Va. 22314.

Terminal Fits Ansi X3.64

ROCHESTER, N.Y. — An Ansi X3.64-compatible smart CRT terminal featuring data speeds to 19.2K bit/sec is available from Volker-Craig, Inc.

The VC3100 features full editing capabilities, buffered edit mode, five-character highlighting attributes, double-width characters, 16 user-programmable string keys and split screen. The display is 24 lines by 80 char. The VC3100 costs \$1,095 from Volker-Craig, 333 Metro Park, Rochester, N.Y. 14623.

Prentice Offers Stat Mux

SUNNYVALE, Calif. — Prentice Corp. has unveiled a statistical multiplexer designed for use in point-to-point networks or as a slave unit in multipoint networks.

The SNP-1100 enables users to select off-the-shelf components to meet the needs of custom network configurations. Standard features include error correction, remote channel loopback, downline loading and complete at-a-glance diagnostic indicators.

Zenith Unveils Terminal Based on Z80

GLENVIEW, Ill. — Zenith Data Systems, Inc. has announced the Z-90, an intelligent terminal based on the Z80 microprocessor. The unit reportedly offers more main memory and disk storage than the firm's earlier Z-89 processor.

The Z-90 adds a double-density disk controller card that doubles the storage capacity of the firm's 5¼-in. disks. Random-access memory is expanded from 48K bytes to 64K bytes and the firm has added a third RS-232 port to accommodate a printer, communications device or other peripherals, the vendor said.

The Z-90 includes a video display, a disk drive and keyboard. It comes with a built-in terminal emulator and can be used to replace any Ansi or Digital Equipment Corp. VT-52 terminal. The Z-90 is a CP/M-based system and is designed for business and professional applications, the vendor said.

The Z-90 with a built-in disk drive costs \$3,195. The same unit costs \$2,895 without the built-in drive. The vendor is based at 1000 Milwaukee Ave., Glenview, Ill. 60025.

Line Controller Has Voice Synthesis

PALO ALTO, Calif. — Digital Pathways, Inc. is offering a second-generation serial line controller with an integral modem and voice synthesis capability.

The SLC-II automatically connects to phone lines and "talks" via an electronically synthesized voice, drawing upon a 300-word vocabulary, as well as a complete alphanumeric library. Its voice spells those words outside its vocabulary, making its message possibilities extensive.

The SLC-II requires no software changes to the host computer's operating system and connects any computer and terminal to monitor the flow of messages, the vendor said.

It costs \$1,975 from Digital Pathways at 1060 E. Meadow Circle, Palo Alto, Calif. 94303.




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CAD/CAM System For Manufacturers Backs 12 Users

BOULDER, Colo. — Graphics Technology Corp. has announced the Series 32 computer-aided design and manufacturing system.

Series 32 systems use MCS, Inc.'s Geometric Modeling Software package, which was originally based on the firm's AD-2000 package.

The system can support up to 12 workstations and can be used in complex mechanical design functions. The system can perform 3-D mechanical design as well as drafting functions, the vendor said.

Other functions include numerical control, production drafting, nesting, finite element modeling, electronic design and business graphics, the vendor said.

The system can be used for structural design, flat pattern development, mapping, plastic injection molding and piping/petrochemical applications, according to Graphics Technology.

An average system featuring a 32-bit Systems Engineering Laboratories processor with 1.5M bytes of memory, a floating point accelerator, a 300M-byte disk drive, a 75 in./sec magnetic tape unit, four high-resolution black-and-white raster workstations and a Hewlett-Packard Co. 24 in./sec plotter costs \$415,000.

Graphics Technology is at 177 Costoga St., Boulder, Colo. 80301.

Line of Turnkeys Targets Hoteliers

WOODBIDGE, Conn. — Marlboro Computer Corp. has announced a line of turnkey processors for the hotel industry.

Based on various Datapoint Corp. processors, the firm's H³ systems can be configured for both large and small hotels, the vendor said.

The most typical processor used in the H³ is Datapoint's 4630. Systems cost between \$50,000 and \$150,000. A system for a 200-room hotel costs roughly \$100,000, the vendor said from 260 Amity Road, Woodbridge, Conn. 06525.

Elxsi 64-Bit, Multi-CPU System Claims Performance Rate Equal To 3081 But at One-Third Cost

By a CW Staff Writer

LOS ANGELES — Elxsi, a three-year-old company based here, has introduced a 64-bit interactive computer system that uses multiple CPUs and a high-speed system bus to reach performance levels that reportedly rival IBM's 3081 processor.

The System 6400 reportedly achieves this performance rate at a cost said to be about one-third that of the 3081.

In a single-processor configuration, the Elxsi system provides about three times the power of Digital Equipment Corp.'s VAX-11/780 at a comparable price. However, with four CPUs packed into a single cabinet, the System 6400 reportedly exceeds the performance of the 3081, the vendor said.

Up to eight processors can be grouped into a single computer system via the firm's Gigabus main system bus, a spokesman said. The system provides up to 192M bytes of MOS memory, reportedly six times more than that available on IBM's 3081, and up to 4G bytes of virtual memory per user process.

Scientific Processing

The system is basically targeted for scientific processing, especially seismic tasks involving large sorts, 3-D analysis and graphics processing. In fact, the system was quietly announced here two weeks ago at the 51st Annual International Meeting of the Society of Exploration Geophysicists.

However, the Los Angeles-based firm has set up a joint venture with Tata, a large engineering company in India, and the Singapore government to establish a company that will market the system for commercial applications throughout Asia, excluding Japan, a company spokesman said. Most likely, commercial applications will involve sophisticated transaction processing tasks, he added.

The 6400's design was based on the use of tightly grouped emitter coupled logic processing units. A single processor configuration delivers a processing speed of about 2.5 million instructions per second (Mips), while a multiple processor setup can push speeds up to 20 Mips, the company claimed.

The key to the system's ability to juggle its many processors is its Gigabus, a 64-bit mode synchronous channel that provides a system bandwidth of 160M- to 213M byte/sec. Elxsi claimed that its Gigabus is the fastest system bus in existence.

Besides the 64-bit-wide data path, each of the 6400's processors sport a 50 nsec cycle time, a 16K-byte two-way set-associative cache with a 100 nsec access time, 16 sets of two-way set-associative buffers and 16 sets of registers.

For arithmetic-intensive operations (so-called number crunching) the system can be enhanced through an optional performance accelerator (PA) that is said to communicate directly with the CPU under its own control. The PA offers 32-, 64- and 80-bit floating point arithmetics; integer multiply and divide; Ascii to binary conversion; and Ascii arithmetic and conversion.

To facilitate the hardware's apparent speed, the system uses the firm's message-based operating system (Embos), which incorporates many of the user-oriented features common to Bell Laboratories-developed Unix.

Embos is a process-based system that allows users to run small portions of a program and attach task-oriented processes to these portions as required, the spokesman stated.

Terminal Tip

The operating system also handles all interaction of a user at a terminal through a terminal interface program (Tip), which has built-in editing functions, windows and help modes, according to the company.

The System 6400 supports Pascal, Fortran 77, Cobol 74 and the C language. The system also supports a relational data base management system that is an extension on USCD Ingres. Specific subsystems include Quel, a query language; a data dictionary; a screen formatter; and a report writer.

Although Elxsi refused to release an exact price for its system, the spokesman did say that a typical configuration would cost about \$1 million.

Elxsi is located at 420 Persian Drive, Sunnyvale, Calif. 94086.

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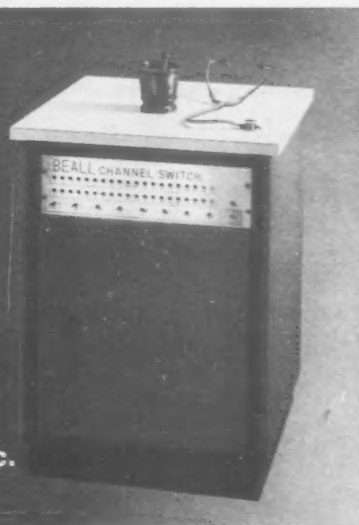
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Bits & Pieces

Tape Drive Features Imbedded Formatter

LOS ANGELES — Spur Products Corp. has announced a 20% rental price increase on its controllers for IBM 1403-N1 printers. The controllers allow the IBM printers to operate on non-IBM processors as well as IBM's Series/1.

The controller and interface now cost \$660/mo on a one-year agreement and \$540/mo on a two-year agreement. An MDP driver is necessary for use on a Series/1 processor for \$72 for a one-year plan and \$60 on a two-year plan, the vendor said from 1904 Centinela Ave., Los Angeles, Calif. 90025.

Spur Products Reports Rental Price Increases

ANAHEIM, Calif. — Datum, Inc. has announced a 45 in./sec tape drive that features single-board electronics and an imbedded formatter.

The D451F's formatter can reportedly service up to three additional daisy chained transports.

The tape drive costs \$6,300, the vendor said from 1363 S. State College Blvd., Anaheim, Calif. 92806.

Digital Associates Offers Interface

STAMFORD, Conn. — Digital Associates, Inc. has announced an HLSP-8 interface that is said to offer increased throughput and a lower line cost than the firm's previous RS-232C interface.

It features transmission rates up to 19.2K bit/sec.

The interface costs \$1,250. Digital Associates said from 1039 E. Main St., Stamford, Conn. 06902.

"How do I save money on terminals when my system is SNA/SDLC?"

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"Universal terminals? What are they?"

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"PaperCRT? Full-screen capability on a hard copy keyboard?"

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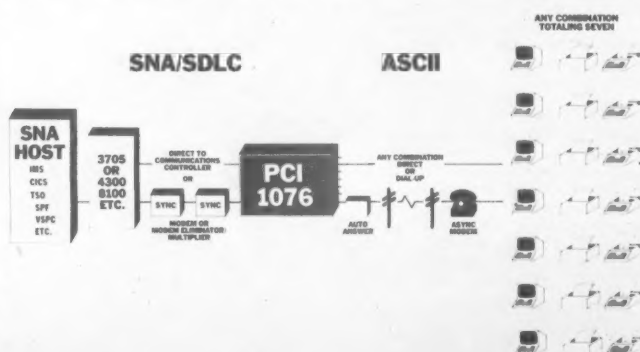
"Sure. Whether the 1076 is at the data center or the remote location, you can have ASCII-to-SNA/SDLC communication from anywhere in the world."

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Along With Applications Software

TI Starts Business Series for DP Novices

AUSTIN, Texas — Texas Instruments, Inc., last week unveiled the first models in a series of small business computers targeted for first-time computer users.

At the same time, the firm also announced two levels of applications software specifically designed to ease small businesses into the computer waters.

The Business System 200 family is TI's initial move onto the small business turf and consists of four machines, the 220, 240, 240 and 251. All of the desktop models feature a 12-in. CRT terminal, detachable keyboard and processor board with 64K bytes of memory.

The systems differ in disk capacities. For instance, the Model 220 packs 1.2M bytes of data on two 5-in., double-sided and double-density flexible disks, while the three other models offer up to 11.2M bytes of storage on TI-manufactured Winchester disk drives and either 5-in. or 8-in. flexible diskettes that are used for backup.

Basically designed as single-user systems, the 200 series is based on the firm's TMS9900 16-bit microprocessor and is compatible with TI's DS990 systems line. The systems are also said to be among the first stand-alone computers to use 64K-bit random-access memory chips in its memory design.

Cobol Programs

Programs for the Business System 200 can be written in Cobol under TI's DX10 micro operating system, a single-user version of the firm's DX10 operating system. Features offered by the new DX10 version include an interactive menu-driven screen, system-command interpreter, sort/merge utility, a keyed index, a relative record and sequential file types, a TI spokesman explained.

The 200 series also supports UCSD p-System, a transportable software development system that allows TI users to run application programs developed in p-System environ-



TI's Business System 200

ments.

Business System Software I and II is written in Cobol and includes such standard business programs as accounts receivable and payable, inventory control and general ledger.

Level I software is an extremely user-friendly package that helps users automate their manual accounting functions. The

software includes five basic accounting programs plus word processing.

Level II, which is compatible with Level I, is a fully integrated accounting system. With this package, a user can update all five accounting programs by making an entry into just one area, the spokesman noted.

Business System Software Level I is geared to run on TI's Model 220 while Level II can operate on Models 240, 250 and 251, as well as on computers in the DS990 line.

Additional applications packages will be available from TI and from third-party sources, the spokesman stated.

To market the new computer systems, TI plans to sell systems through an authorized dealer program. This program will be made up of qualified OEMs and retail distribution channels such as business equipment dealers and computer stores. Before being accredited, all potential dealers must attend free TI-sponsored training programs that instruct sellers on how to deal with the small business customer.

The starting price for the standard Business System Model

(Continued on Page 62)

Cromemco Unveils Desktop Unit With Business Software, DBMS

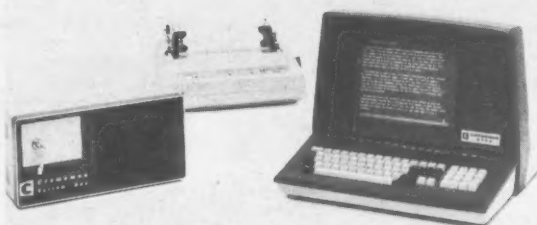
MOUNTAIN VIEW, Calif. — Cromemco Corp. has introduced a desktop computer designed for both single and multiple users that features both system expandability and a variety of business-oriented software packages, including a data base management system (DBMS).

The System One includes a Z-80A-based CPU with a basic 64K bytes of random-access memory, a printer interface and dual quad-capacity 5-in. floppy disk drives that provide 780K bytes of storage. The computer also includes a system diagnostics routine that enables a quick test of the system's memory, controller and disk drives.

The System One's eight-slot card allows for additional memory and I/O boards for expansion and customization.

Software for the System One consists of the firm's "Master" series of packages, including Writemaster, a display-oriented word processing program; Slidemaster, a graphics and test display package; and its DBMS. The DBMS package provides the standard file management capabilities along with a report writer that allows the user to produce reports of arbitrary format from data stored within the data base, according to a spokesman.

In addition to applications software, Cromemco also offers a range of systems software including structured Basic, Fortran, Cobol, C and Lisp. Also available with the system is the firm's Cromix multiuser, multi-



The Cromemco System One

tasking operating system.

The desktop computer costs \$3,995, the spokesman said

from the firm's headquarters at 280 Bernardo Ave., Mountain View, Calif. 94043.

32M Bytes of Storage

Vector Graphic Builds 3032 on Z80

THOUSAND OAKS, Calif. — Vector Graphic, Inc. has announced the 3032, a Z80 microprocessor-based machine that offers up to 32M bytes of disk storage on 8-in. Winchesters.

The Model 3032, a CP/M-based system, supports Vector Graphic's Memorite III word processing system as well as the firm's Execuplan financial planning and forecasting software, the vendor said.

The 3032 uses Vector Graphic's dualmode disk controller, which features automatic error detection. A 630K-byte floppy disk can be incorporated into the module along with a Winchester drive, according to the vendor.

Vector Graphic's 3500- or 7700



The Vector Graphic 3032

letter-quality printers are also supported, the vendor said. It costs \$12,795. Vector Graph-

ic is headquartered at 500 N. Ventu Park Road, Thousand Oaks, Calif. 91320.

INTERNETWORKING

MDB 4200 Now Designed For Novas, Eclipses

ORANGE, Calif. — MDB Systems, Inc.'s controller, previously available with Digital Equipment Corp. LSI-11 controllers, is now being incorporated into MDB's Data Channel line printer controllers for use with Data General Corp. Nova- and Eclipse-type computers.

The MDB 4200 controllers are designed to interface the DG computers to all major industry printers with Centronics Corp., Dataproducts, Inc. and General Electric Co.'s Terminet interfaces, the firm said.

The self-test capability of the controller is comprised of two individual diagnostic features called Print-test and Loop Back and is coupled with LED visual indications for transmitted data and printer status signals.

The MDB 4200 line printer controller is housed on a single 15-in. board and costs \$1,500, including cable. MDB can be reached at 1995 N. Batavia St., Orange, Calif. 92665.

Bits & Pieces

Single Board Net Ability Available for S-100 Users

TUSTIN, Calif. — Complete networking capability for S-100 users including bank-switched memory and parity checking is said to be available on a single board from Multi-User Microsystems Corp.

Net/82 features a Z80A CPU, two serial ports, optional floating point processor, interrupt controller, shadow erasable programmable read-only memory, real-time clock and an S-100 parallel port for communication with the master CPU.

Net/82 is compatible with the firm's Mudos operating system as well as Digital Research, Inc.'s CP/M, MP/M and CP/NET operating systems. Net/82 costs \$1,395 or \$1,995 with 128K-byte and floating point processor.

The vendor is located at Suite 11, 1451 Irvine Blvd., Tustin, Calif. 92680.

File Management Unit Out For Textronix 4050

BEAVERTON, Ore. — Textronix, Inc. has announced the 4909 multi-user file management system that allows shared access to large capacity mass storage on up to 10 of the firm's 4050 desktop processors.

The unit is available with 32M- or 96M-byte disk drives with archive storage on a 16M-byte disk cartridge. For the 96M-byte configuration, an auxiliary cabinet is available for two additional 32M- or 96M-byte drives, the vendor said.

The 4909 subsystem costs between \$22,750 and \$33,800. The vendor can be reached through P.O. Box 500, Beaverton, Ore. 97077.

Maintenance Service Aimed at System/34 Users

FRAZER, Pa. — The Sorbus Service Division of Management Assistance, Inc. announced a preventive and remedial maintenance service for the IBM System/34 computer and associated peripherals.

The service will be available initially in 26 areas across the country, the vendor said, claiming it will cost an average of 20% less than what most end users currently are paying for maintenance.

The areas are Buffalo, Rochester, New York City, Long Island, northern New Jersey, Philadelphia, Pittsburgh, Atlanta, Chicago, Cincinnati, Cleveland, Detroit, Indianapolis, Madison, Minneapolis, St. Louis, Dallas, Fort Worth, Houston, Denver, Kansas City, Los Angeles, Orange County, Oklahoma City and San Jose.

Sorbus is located at 50 E. Swedesford Road, Frazer, Pa. 19355.

Alphanumeric Printer Available for Micros

NEEDHAM HEIGHTS, Mass. — Memodyne Corp. has announced a 20-col alphanumeric thermal printer for microcomputers.

Called the Model MAP-20P, the unit is rack-mountable and accepts an 8-bit transistor-transistor logic parallel input at data rates up to 2,000 char./sec. Other features include a 96-char. printset, a print rate of two line/sec, an internal self-test mode and microprocessor control, the vendor said.

TI Starts Business Series

(Continued from Page 61)

220 with flexible diskette storage is \$6,200. Shipments are scheduled to begin the first quarter of 1982.

Software is priced at \$500 for a Level I package and \$1,000 for each Level II package. System software for the 200 series starts at \$400. Additional information on the Business System series or software can be obtained from TI's Computer Systems Division, P.O. Box 2909, M/S 2196, Austin, Texas 78769.

The unit costs \$625, the vendor said from 220 Reservoir St., Needham Heights, Mass. 02194.

Hard-Disk Controller Available from Dilog

GARDEN GROVE, Calif. — An intelligent microprocessor-based Winchester hard disk controller, designed to interface two Seagate ST506- or ST512-compatible disk drives with RL01/RL02 emulation, is being offered by Distributed Logic Corp. (Dilog) for use with Digital Equipment Corp. LSI-11-, 11/2- or 11/23-based computer systems.

The Model DQ604 is a quad-size board that plugs into a single Q-bus slot for minimum space and power requirements, the firm claimed. The controller runs under the RT-11 and RSX-11 operating systems using DEC RL01/RL02 drivers. A format diagnostic routine is supplied with each controller.

A self-test card edge LED is included with the unit, which costs \$2,050 from the firm at 12800 Garden Grove Blvd., Garden Grove, Calif. 92643.

Power Conditioner Offered For Minis, Micros, WP

PLAINVIEW, N.Y. — Pilgrim Electric Co. has announced the Voltector Series 6 ac line of power conditioners for minicomputers, microcomputers and word processors.

The units protect against power spikes, surges and transients as well as against radio frequency interference. Series 6 can protect against up to a 500A surge with 10 sec rise times and 1,000 sec half-amplitude decay times, the vendor said.

The units cost between \$79.50 and \$119.50, the vendor said from 29 Cain Drive, Plainview, N.Y. 11803.



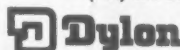
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RENTALS

Honeywell, NCR, Burroughs Decline Mainframers' Third-Quarter Nets Drop

The strength of the U.S. dollar on world money markets and a slow European economy continued to hurt the earnings of major mainframers during the third quarter.

Honeywell, Inc.'s third-quarter earnings plunged 31%, NCR Corp.'s earnings went down 30% and Burroughs Corp.'s earnings dropped 23%. IBM had also reported a 22% decline in earnings for the latest quarter [CW, Oct. 19].

On a slightly brighter note, Control Data Corp. reported a 29% increase in earnings from its computer business and an overall earnings increase of 9.7% for its latest quarter. However, CDC derives only about 35% of its revenues from foreign sources, much less than most major computer firms.

Honeywell reported third-quarter earnings of \$32.4 million or \$1.43 per share, down from \$46.8 million or \$2.11 per

share in the like quarter a year ago.

For its first nine months, Honeywell reported earnings of \$156.1 million or \$6.89 per share, up 5.7% from \$147.7 million or \$6.64 a share for the same period last year.

A large part of this loss resulted from a "significant" operating loss reported by the firm's 47%-owned French affiliate, CII Honeywell-Bull. The affiliate is expected to report a loss for the

year, which with the negative impact of foreign currency translation could cause Honeywell's 1981 earnings to "fall modestly below 1980," the firm said.

Total corporate revenues advanced 8% for the quarter, reaching \$1.27 billion from \$1.18 billion. For the nine-month period, Honeywell's revenues totaled \$3.8 billion, up 8.5% from \$3.5 billion for the same nine months of 1980.

Burroughs' revenues climbed 14% to \$797.2 million from \$699.3 million a year ago. For the nine-month period, Burroughs reported total revenues of \$2.4 billion, up 13% from revenues of \$2.1 billion for the corresponding period of 1980. Revenue from outright sales increased 16%; services, 13%; and rentals, 3%.

On the other hand, third-quarter earnings dropped to \$32.4 million or 78 cents per share from \$42.1 million or \$1.02 per share in 1980's third quarter.

Year-to-date earnings showed
(Continued on Page 74)

Republican Hits 'Utter Confusion' In International Trade Situation

By Jake Kirchner

CW Washington Bureau

WASHINGTON, D.C. — Despite the Reagan administration's "superior" attitude toward free trade, government "chaos" has left U.S. firms facing a growing number of import barriers around the world, a member of a key congressional trade committee said here recently.

"I regret to state I haven't seen a hell of a lot of improvement," Rep. Bill Frenzel (R-Minn.) told a recent meeting of the Computer and Business Equipment Manufacturers Association (Cbema).

Describing himself as "exceedingly disappointed," Frenzel, a member of the House Ways and Means Subcommittee on Trade, said there is "utter confusion" in Washington's efforts to resolve international trade problems.

Price of Inaction

"Congress has not been as aggressive as it should be in trying to resolve the problems," he said, spreading the blame. And the price of inaction is steep: "All over the world we run into new barriers every year."

On the bright side, there have been what he characterized as small breakthroughs in trade dealings with Japan, but they have come only after years of negotiations. Despite the set-

back to U.S.-Japanese relations caused by the recent American import quotas on Japanese cars, Frenzel said, American firms can still do very well in Japan.

Companies "who are willing to hang in there" can make a higher rate of return on their investment in Japan than in any other country, according to Frenzel. However, "it takes a fair amount of persistence" and

several years to develop good markets in that country.

Unfortunately, having forced Japan to accept the auto import quotas, "America is beginning to look less like a shining beacon of free trade," he added.

It seems that "America is falling prey to the same [protectionist] disease that has stalked our trading partners." This is

(Continued on Page 69)

If Sales Tax Collected

Calif. Firms Fearing Bankruptcy

By Robert Batt

CW West Coast Bureau

Hundreds of small software houses in California said they may be forced out of business if a sales tax currently being levied is not revoked.

The controversy, which has been simmering for several years [CW, Jan. 28], could have vast implications for the software industry because other states look to California for a lead. Most state authorities have yet to declare whether software is taxable.

The battle is likely to come to a head over the next few months as various software companies and members of an organization called the California Sales Tax Action Group (Stag) challenge the State Board of Equalization, which administers sales tax. Stag was formed

A Way to Get Revenues

At a time when the pressure on state funds is greater than ever because of cutbacks in federal government programs, each state is desperately keen to maximize its revenue collections.

In California, the state's Regulation 1502 (concerning sales tax) is now being carefully expanded and developed in order to maximize the amount of taxes that

should be paid, according to Frank Holby, principal auditor for the San Jose district.

It is this expansion of the regulation that is now the subject of bitter controversy between software houses — particularly small ones, the so-called job shops — and the California State Board of Equalization.

Regulation 1502 states, "Tax
(Continued on Page 66)

in reaction to demands that its members should pay back taxes.

The Board of Equalization's Regulation 1502, which concerns data processing services and equipment, is at the heart of the controversy. The board

claims that customized software that is transferred in a physical property form such as a disk or a tape is subject to California's 6½% sales tax.

This interpretation is being
(Continued on Page 66)

Econometrics Exec Predicts Automation Boom

By Marcia Blumenthal

CW Staff

NEW YORK — A capital boom that will spur a rush to automation is set to explode, according to Dr. Lawrence Chimérine, president of Chase Econometrics.

This sort of boom, which has not been experienced since the 1960s, will ensure the computer industry a slot as one of the top three performing industries for the foreseeable future, Chimérine told a group of industry executives gathered for the OEM Business Forum here recently.

Although Chase Econometrics has had a generally gloomy outlook on the economy for the past couple of years, Chimérine

said some of the underlying factors in the economy are beginning to improve. The forecasting group's guess is that the economy will pick up in about six months.

Effects of Recession

Whether President Reagan's recent announcement about the U.S. entering a "light" recession will have any influence on the forecasting company's subsequent forecasts is unknown.

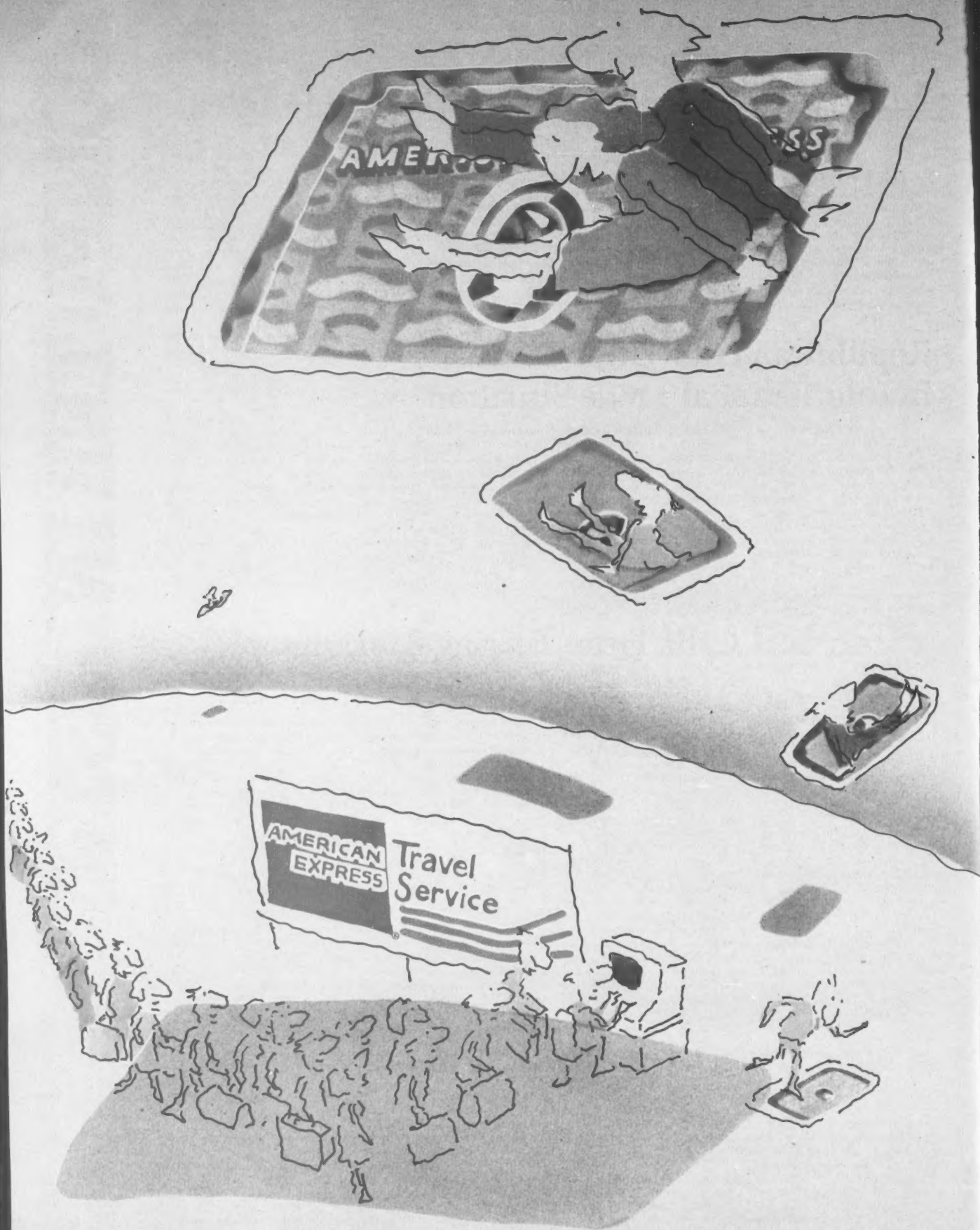
The economy has stagnated since 1978 because U.S. families have not been able to improve their purchasing power. Two factors have led to this condition, Chimérine observed. The first is the rising price of

oil, which in 1972 consumed .5% of a family's budget, but which today consumes 4.5%.

Moreover, worker productivity has fallen to zero after rising at a steady rate of 3% annually in the early years of the last decade. A good part of the productivity doldrums was caused by a massive infusion of unskilled workers in the work place — primarily young people and spouses who opted to return to work.

However, in the next few years oil prices will not increase dramatically. With an estimate of a 10% annual increase in oil prices instead of a 35% increase, Chimérine

(Continued on Page 70)





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Firms Fearing Bankruptcy

(Continued from Page 63)

challenged in a San Francisco court by Shasta General Systems, Inc., which is suing the Board of Equalization for a refund of \$50,000 that its subsidiary, General Business Systems, was forced to pay in back taxes. Shasta is claiming that since intangible items are not taxable under state rules, it should not have been taxed.

The central question revolves around whether software is tangible. The stakes are big. One estimate put the potential back taxes to be collected at \$10 million if the state wins.

Al Eagle, a San Francisco attorney who is handling 10 cases including Shasta's, believes the Board of Equalization "is going way beyond the interpretation of Regulation 1502. It keeps on changing its mind about the law and in fact it is traumatized because it doesn't want to argue the facts. It can see a lot of potential taxes out there which have not been charged and it is after compliance with its interpretation because there is a lot of money involved."

Stag claimed that should the state board press ahead with its determination to levy taxes on customized software, it will have a deleterious effect on software development throughout the state. A demand for retroactive taxes, Stag said, will put many companies out of business.

Most companies, unlike Shasta, do not have the resources to challenge the Board in court. Under the regulations governing business taxes, a company must first pay the sales tax before it can appeal for a refund.

For many companies, the prospect of back taxes is extremely worrisome. One such firm is Final Systems, Inc., a Cupertino, Calif., company specializing in the manufacture of a software accounting package. The com-

pany was told it was eligible for sales tax for work carried out over the past three years — a backlog estimated at around \$15,000.

Lacking the resources to fight the case in court, the company has been using a series of arguments to get the bill dropped. "The tax is only applicable to fabricated labor and up until now, programming has not been considered fabrication," Austin Stephens, company president, said. "If the state gets its way on this, many companies will face bankruptcy."

Large Firms Concerned

However, management information systems managers in the user departments of big corporations also have cause for concern. At a time when company budgets are tight, the prospect of having to finance a 6½% sales tax out of existing funds has obvious implications for future product purchases.

One large company refusing to take the tax lying down is Tymshare, Inc., based in Cupertino. The company has been asked to pay back taxes of around \$200,000, but a company spokesman said "we suspect we will find ourselves in court over this issue and our resolve is pretty strong."

Tymshare argued that software delivered in a tangible form such as a disk or tape has a limited taxable value. The company said it will pay tax on the value of the tape or disk, but not on the software it contains since this is intangible.

"The state is claiming tax should be applied on the overall market value. This simply isn't right," the Tymshare spokesman maintained. "The state is seizing upon a straw to try and increase its tax collections. We maintain that the tape is merely packaging."

Action Seen Way to Get Revenues

(Continued from Page 63)

does not apply to the transfer of custom programs in the form of written procedures, such as program instructions listed on coding sheets. Tax applies to the sale of custom programs transferred to the customer in the form of punched cards, or in tape, disk drum or similar form."

The regulation goes on to state that activities consisting of the development of ideas, concepts and designs are regarded as nontaxable services. These include "designing and implementing computer systems, consulting services" and "providing technical help, analysts and programmers, usually on an hourly basis."

Tangible Vs. Intangible

Left open to interpretation is whether tax transferred via tape or disk should be taxed on the value of its physical tangible property or its overall market value. The state is maintaining the latter, while software companies argue most of its market value is intangible and is therefore exempt from tax. Also unclear is the case of programs transmitted via telephone lines. Some tax auditors are making it subject to sales tax and others are not.

The state maintains that most transfer of program software involves the use of fabricated labor, taxable under California regulations. At the same

time, the Board of Equalization rejects the charge that it is using the increasing value of software to extend 1502 beyond its legal limits.

Richard Ochser, an attorney for the state board in Sacramento, said: "It is my opinion that a computer program is intangible property. A program in and of itself is simply a set of instructions and is intangible, no doubt about it. However, if, as is usually the case, the seller of the program transfers it in a physical form such as a tape or disk, this is a sale of tangible personal property and is taxable."

The problem for many small companies is that payment of such taxes would not necessarily be a problem if the regulation was explicit. However, most of them face a Catch-22 situation: If they start charging their customers sales tax, the state board will find out about them and charge them for taxes not paid in the past and for which they did not charge their customers. If they do not start charging sales tax, they could be in violation of the regulation and face severe financial problems if the authorities catch up with them and levy back taxes.

Most are hoping pending court cases will resolve the issue in their favor. But this is likely to take a while and a state declaration of a tax amnesty remains their best hope.

In First Official Press Conference

Trilogy Promises High-Performance CPU

By Robert Batt

CW West Coast Bureau

SAN JOSE, Calif. — A high-performance, IBM-compatible CPU capable of outperforming any of its competitors has been promised by Trilogy Systems Corp.

In its first official press conference, held here recently, the Cupertino, Calif., company said the design of its new system, which it plans to begin shipping in the second half of 1984, will be smaller in size, but faster, than systems from such major competitors as IBM, Amdahl Corp. and

Hitachi Ltd.

Trilogy, whose founders include the father-and-son team of Gene and Carl Amdahl, sees IBM's 3081, Amdahl's 580 and Hitachi's AS 9000 (marketed in the U.S. via National Advanced Systems, Inc.) as the major competitive threats. But "we believe we have something in our technology that will give us a unique capability. With this technology we plan to be about 50% faster than the fastest computer in 1984," Gene Amdahl, Trilogy chairman, said.

The computer's design would also incorporate additional redundancy in order to provide for virtually non-stop operations, the company

claimed. In addition, it intends to increase significantly the use of remote diagnostic services — "to the point that all important operating programs and system components can be diagnosed remotely," Amdahl said.

Irish Facility

Trilogy plans to set up its major manufacturing facility in Dublin, Ireland and has received \$18 million in grants and tax arrangements from the Irish Development Authority. Fabrication of the semiconductor component, rumored to be the chief technological weapon in Trilogy's armory, will be carried out at the

company's Cupertino plant.

Trilogy estimated that the market for plug-compatible equipment in 1985 will top 2,000 systems with a value in excess of \$6.5 billion. Within this market, the most rapidly growing segments are on-line and scientific applications, and this is where Trilogy's initial marketing effort would be directed, the company said.

Gene Amdahl claimed that while IBM would be Trilogy's major marketing competitor, the Japanese will pose the chief technological threat. Trilogy said it has entered into serious negotiations with Japanese manufacturers to market the new system in Japan.

Orders & Installations

Anacomp, Inc. has announced agreements with First Union Bank of Charlotte, N.C., to design, develop and install two wholesale banking computer software systems.

Ford Motor Co. has chosen Worldwide Integrated Communications from Mohawk Data Sciences to upgrade its administrative message communications network.

Applied Communications, Inc. has announced electronic funds transfer (EFT) contracts with First National Bank of Boston, Mid-Continent Computer Services of Denver and S & L Computer Trust of Des Moines, Iowa. The contracts require Applied Communications to provide computers, software and services to implement an EFT network for each customer.

MSI Data Corp. has signed a contract for approximately \$6 million with the customer service division of IBM Corp. for hand-held portable data terminals to be delivered within the next year.

Intergraph Corp. has shipped its first system based on a Digital Equipment Corp. VAX processor to the Exploration and Production Group of Phillips Petroleum Co.

Modular Computer Systems, Inc. has received an order valued at \$170,000 from Armco, Inc. to supply a Dual Classic 7840 computer system with a Codacs III I/O.

Northern Telecom, Inc. has received an order from the State of Vermont for its Model 294C on-line terminal systems. The order calls for 13 Model 294C systems with 137 display stations and 15 printers.

New orders for the Sperry Univac System 80 have been received from Borg Warner Health Products, Inc. of St. Louis; The Beacon Group of East Hartford, Conn.; the City of Clearfield, Utah; Pardee Hospital and Fletcher Hospital of N.C.; Brescome Distributors Corp. of South Windsor, Conn.; Alsthom Atlantique in Sant Nazaire, France; the Indo Suez Bank in Singapore; Degremont, a water softening company also in France; and Aichi Metal Industry Co. of Japan.

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ITC Begins Studying Effects Of U.S. Service Firms Abroad

By Jake Kirchner

CW Washington Bureau

WASHINGTON, D.C. — The U.S. International Trade Commission (ITC) has begun an investigation into the effects of overseas activity by U.S. service industries, including DP and telecommunications, on American merchandise exports.

Announcing the nine-month study late last month, ITC said it will cover the level of product exports generated by selected service industries, "the implications of international service trade barriers and the nature of product movements in international markets and foreign shipments of merchandise attributed to existing U.S. services trade."

In the area of DP service, for example, an ITC official explained the commission will study to what extent sales of computers and computer-related items are a follow-on of the service activities and what kinds of product sales are generated by the service.

The commission is coordinating its investigation with the office of the U.S. Special Trade Representative (STR), which is looking into trade problems facing service industries, according to Larry Brookhart of the ITC Office of Industries. The STR under the past two administrations has given high priority to service indus-

try trade [CW, Aug. 25, 1980, May 11].

The ITC has "a great deal of commodity expertise," Brookhart said, but he noted there is little information on merchandise exports generated by service industries. "Given the growing importance of [services] and the emphasis of the STR," the commission has decided it needs to take a closer look at those industries.

Benchmark Use

Information gathered will "be used as a benchmark for service activities [by the commission] and probably by the Trade Representative in their deliberations," he added.

Brookhart said there will be "a significant amount of research" associated with the study, which is expected to wind up in July 1982. The ITC is preparing a questionnaire to solicit data from the various service sectors covered in the investigation and is asking for comments from interested parties.

According to Brookhart, the ITC is not planning to hold hearings on the subject, but will do so if there is sufficient demand.

Written comments on the investigation should be submitted by March 15, 1982 to the Secretary, U.S. International Trade Commission, 701 E. St. N.W., Washington, D.C. 20436.

Executive Corner

- Tres Systems, Inc. has promoted Orie E. Cory to vice-president of the internal systems and services group.
- The election of G. Jack Lorez as executive vice-president of corporate planning and Donald S. Bates as president of the Datalex Co., a telecommunications Computer Group was recently announced by United Telecommunications, Inc.
- Northern Telecom, Inc. electronic office systems division has appointed Jerome Niemann and Christopher Searles to the positions of vice-president, regional field engineering and regional sales, respectively, for the Midwest region.
- Jack Neth has been named to the position of division vice-president of field engineering for Compuscan, Inc.
- Melvin L. Shapiro has been appointed vice-president and general manager of the operations division of Carterfone Communications Corp.
- Carolyn J. Morris has been named president of The Datalex Co., a developer of microcomputer software.
- Richard W. Thatcher Jr., currently president of Atlantic Software, Inc., will assume the position of chairman and chief executive officer, and Robert P. Wolk, currently executive vice-president, will assume the role of president and chief operating officer of that company.
- Gary E. Liebl has been appointed president of Microdata Corp.
- Winston C. Black Jr. has been named president of Compass Computer Services, Inc.
- Okidata Corp. has announced the appointment of Chet Baffa to the position of vice-president of marketing and sales.
- Micro Five Corp. has appointed Soron Litman vice-president of marketing.
- Douglas V. Brunson has been named vice-president, product strategy, at Exxon Office Systems Co.
- Vector General, Inc. has promoted Thomas Kehl to the newly created post of senior vice-president.
- Bernard T. O'Connot has been promoted to the position of vice-president of manufacturing for 3H Industries, Inc.
- Atam P. Lalchandani has been named treasurer of National Advanced Systems, the wholly owned subsidiary of National Semiconductor Corp. Kenneth W. Jonker has been promoted to vice-president of administration at the same company.
- John W. Murdock has been appointed vice-president and corporate head of training and information resources management at the Maxima Corp.
- Erich Bloch has been elected a vice-president at IBM, in charge of corporate technical personnel development.
- Valtec Corp., which recently became a joint venture owned by N.V. Philips (The Netherlands) and M/A-Com, Inc. (Burlington, Mass.), has restructured its top management organization and named four new vice-presidents. They are Meint P. Smid (senior vice-president), Dr. Ishwar D. Aggarwal (research and development), David L. Hardwick (sales) and Paul F. Burch (manufacturing operations).

Senator Raps U.S. Stand on Developing Nations

By Jake Kirchner

CW Washington Bureau

WASHINGTON, D.C. — Reagan administration economic and trade policies toward developing countries were forcefully criticized recently by a Senate Republican who called the policies short-sighted and self-defeating.

The U.S. "can no longer 'go it alone,'" Sen. Charles McC. Mathias Jr. said this month in an address to the computer and Business Equipment Manufacturers Association (Cbema). He decried U.S. efforts to downgrade the activities of the World Bank and other multilateral development institutions to help emerging economies.

Mathias did not specifically point to the White House in his prepared remarks, but his statement came shortly after President Reagan and Treasury Secretary Donald Regan urged the World Bank and the International Monetary Fund to increase demands on borrowing countries to streamline their domestic economies before qualifying for international development loans.

Fashionable Debunking

"It has become fashionable in some circles to debunk the World Bank and other development financing institutions," Mathias said, arguing "our economy gets back three dollars for every dollar we allocate to the multilateral development banks."

His statement was particularly timely because Reagan was about to attend a 21-nation meeting in Mexico held last week, called to advance the so-called "North-South dialog" between the industrialized nations and developing countries.

Administration officials advanced the position there that real economic progress for the Third World cannot come through multilateral financing alone and that developing nations would be better served by putting their domestic economies in order and relying more on free trade and international private investment.

But, "developing for the poorer nations of the world is very much in the selfish economic and political in-

terest of the U.S. . . . The nations our aid program and the multilateral development banks supported in the past are among your best customers today," Mathias told the Cbema gathering. "The nations we support today will be your best customers tomorrow providing we don't pull the rug out from under them."

Noting certain developing sectors grew at a faster rate than developing countries during the 1970s, he said the U.S. will reap "important economic and security dividends" by maintaining open markets for products and sustaining the flow of development funds.

"Choking off the flow of multilateral bank financing — as some advocate — would yield less, not more,

private commercial lending and investment," he said. "The multilateral banks and the International Monetary Fund play a crucial role in encouraging developing countries to liberalize their economies and to stimulate the private sector."

"The presence of the banks and the Fund also gives foreign private lenders and investors the courage they need to take the plunge," he added.

Turning to the developing countries' side of the equation, Mathias raised a subject dear to the hearts of Cbema members — growing restrictions on international investment. Electronics industry spokesmen recently complained to Congress that foreign governments are restricting outside investment and hampering

development of markets for high-technology goods and services around the world [CW, Aug. 24].

Mathias called for "a liberal investment policy," which he said "will yield far more jobs in the long run than attempts by governments to allocate capital flows through regulation or subsidies."

"For this reason," he continued, "I am concerned about the tendency of foreign governments to resort increasingly to restrictive policies toward U.S. and other international investment entering their countries."

"Such policies are especially galling when they are pursued by developing countries whose industries are already mature competitors in the world economy," he added.

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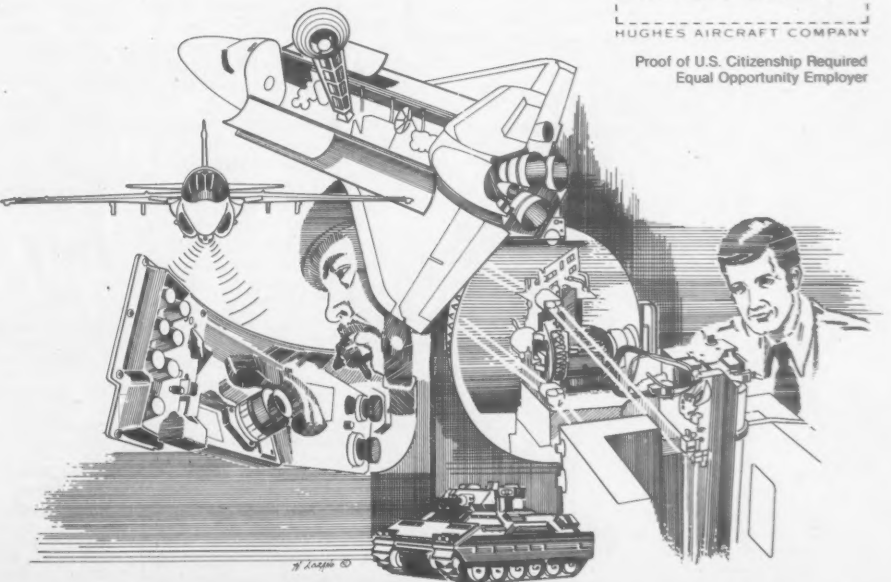
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Republican Hits Trade Situation

(Continued from Page 63)

leading to a "deteriorating . . . environment for relatively unrestricted trade," according to Frenzel.

The quotas have "tainted our relationship with Japan," he said, suggesting they are slowing the process of negotiating away other trade problems between the two countries. "We're not able to move forward because Japan is still sulking about having to accept what was obviously a highly protectionist measure."

Addressing international trade on a worldwide basis, Frenzel said domestic economic problems confounding most countries must be solved before reduced trade barriers can be arranged.

If the U.S. can rebuild a strong economy at home, other nations will "follow us out" of their own economic doldrums, he commented.

According to Vidcom '81 Speakers High Tech Likely to Reduce Data Services' Risks

By Phil Hirsch

CW Washington Bureau
CANNES, France — Impending technological advances are likely to make the marketing of interactive information services less risky and more profitable.

That recurring theme ran through a number of presentations at Vidcom '81 here recently. Vidcom, which began six years ago as a conference and trade show for users and suppliers of recorded video programs and systems, now encompasses what the French call "telematique" — products and services that distribute information through computerized communications systems.

Harry R. Collier, editor of *Electronic Publishing Review*, a trade journal published in the UK for the data base services industry, said the typical data base operator cannot survive just by selling information retrieval on-line. He

must also sell hard copies of the same material, or he must be in a related business — like the *New York Times* and *Wall Street Journal* — so that the costs of information acquisition and preparation can be shared.

Conceptual Problems

Mark Foster, chairman of Microband Corp., the New York-based specialized communications carrier recently acquired by Tymshare, Inc., argued that the on-line services industry's present problems are not so much economic as conceptual.

Videotex and teletext are "new technologies in search of an application," he said. While the information provided may be useful, it costs more than many prospective users are willing to pay. Foster pointed out that AT&T's Dial-It service, which provides up-to-date weather, sports and similar informa-

tion, generates 20 million calls/mo in New York City alone. The reason for this success, he said, is low cost — Dial-It service is delivered for the price of a local telephone call.

Foster predicted that near-term future improvements in communications networks will permit quantum reductions in the cost of transmitting on-line information. The major improvement he cited is hybrid distribution networks — use of telephone circuits to transmit the user's query to the data base and wideband microwave to return the answer.

Foster said it now costs \$800/subscriber to build a one-way cable TV network; by 1985, because of inflation, the cost will be \$1,200/subscriber for a one-way system and \$1,400/subscriber for a two-way system. "The return on investment at that time would be suspect, at best, to any investment manager," he added.

By comparison, a one-way microwave distribution system using an omnidirectional transmitter can be installed for "under \$100/subscriber," he said. Microband, coincidentally, is the major owner/operator of multipoint distribution systems — one-way microwave networks powered by omnidirectional transmitters.

Hybrid Nets

Hybrid distribution networks were also a topic of discussion at Viewdata '81, the videotex conference held in London the same week. There, Roy Bright, chief international marketer for the French Telematique program, discussed a hybrid system called Inteltext [CW, Oct. 12]. It is "likely" to be pilot-tested in the U.S. early next year, he added, but declined to give any further details.

The French have a close relationship with Tymshare, to whom they recently sold several thousand electronic directory terminals; they also worked with Microband before it was acquired by Tymshare.

Tymshare's new French terminal is expected to be officially unveiled "before the end of this month," Foster said. The terminal consists of a small CRT with attached keyboard; its key feature is "one-buttoned dial-in and computer access," he added, but declined to give the price.

Microwave local distribution systems and local-area networks connected to packetized satellite/terrestrial long-distance networks as

well as the Bell systems will provide what Foster called "the multinet." He expects the multinet to cut costs of emerging information services enough to widen the customer base significantly.

Not So Optimistic

Collier was not so optimistic: "We have to recognize that a very high percentage of the total costs of data base creation is in human beings ... and these costs do not decrease nor are they greatly vulnerable to the microchip." Collier's conclusion was that the data base operator's costs will come down, but not as quickly as the pace of technological change

might suggest.

If the market grows, of course, these labor costs — which tend to be dependent on the number of data base records produced rather than on the number of customers who access them — will decline on a unit basis. Another Vidcom '81 speaker, consultant Roger Pye, said there are significant indications the market is growing.

The French, English and Canadian videotex systems all include gateway capability, and a number of terminal and computer makers — notably including IBM — have recently announced systems interfaceable to these facilities.

Econometrics Exec Predicts Boom In Automation Mart

(Continued from Page 63)

ine said the inflation rate should drop 2%. And, the economy has now absorbed the preponderance of unskilled workers, so productivity will not decline any further, he reasoned.

These mitigating factors will increase consumer purchasing power, which combined with new tax rules favoring capital formation will spur productivity growth. "This year productivity will rise for the first time since 1977 and a continued sustained advance in productivity will take place over the next several years," he said.

The capital expansion environment in the mid-1960s resulted in a tremendous amount of automation, which improved productivity. "In my opinion we are going back to that same environment," Chimerine said.

Driving capital expansion

are new regulations on accelerated depreciation. The ability of businesses to take a quicker write-off on capital expenditures will be a major inducement to automate, causing a boom for the computer industry, he said. In Japan the average life of business equipment is 4½ years before it gets replaced, but in the U.S. the same equipment stays in place for nine years.

The Japanese have achieved productivity growth by replacing equipment, which takes advantage of new technology. Until now, the U.S. tax environment has discouraged the adoption of new technology.

In addition to private business automation, the defense buildup anticipated by the Reagan administration will have a favorable impact on the computer industry because of the nature of new weaponry.

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Fujitsu-ICL Deal Reinforces Challenge to IBM

By Robert Batt

CW West Coast Bureau
LONDON — Fujitsu, Japan's largest computer maker, has reinforced its thrust into the European market through a deal with the UK's ICL Ltd.

The deal gives ICL access to Fujitsu's advanced microchip technology in return for marketing Fujitsu computers in Europe. It is designed to strengthen both companies

in their challenge to IBM.

This is Fujitsu's second marketing deal in Europe, following a collaborative venture with the West German firm, Siemens AG.

For ICL, the UK's largest computer maker, it marks the start of a comeback for the company after a disastrous year when its profits plunged, debts ran up to \$400 million, its senior managers were sacked and the

British government was forced to give the company a loan guarantee of \$420.8 million. It was also subject to takeover bids by Sperry Univac and Control Data Corp.

Christopher Laidlaw, ICL's new chairman, announced the agreement here but declined to give specifics. He did say that the agreement means, "We will be riding on the back of a very large investment made by Fujitsu."

The British government, he added, need no longer worry about ICL's ability to supply its largest customers with hardware for the 1980s.

In recent months, the British company has radically restructured its product line and the company, which reported a first half 1981 loss of \$44.8 million, said further streamlining costs up to \$80 million will be necessary.

This week ICL is expected

to unveil its latest small computer, the DRS 20, which broadly replaces the 1500 series of minicomputers. Two microcomputers will be announced first, sources said, to be followed by one more, which could possibly be developed into a personal computer to compete with IBM's latest offering. ICL is keen to emphasize the capability of the DRS 20 range to link up with other networks and it refers to its new systems as "multimicros."

In an attempt to launch an aggressive attack against IBM in the European market, the Fujitsu mainframes will be marketed under the ICL brand name. For a long time, ICL was the No. 1 European computer maker, although recently it has fallen behind CII-Honeywell Bull of France. Consequently, its name and marketing base is well known throughout the continent. Fujitsu foreign sales, on the other hand, account for just 15% of overall volume, which in the last financial year totaled \$2.43 billion.

Fujitsu is therefore anxious to increase its share of the European market and two weeks ago it gained a London stock market quotation. It is not thought, however, that the Japanese company will take an equity stake in ICL as it has done with another mainframe manufacturer — Amdahl Corp. of Sunnyvale, Calif.

The ICL-Fujitsu link is clearly intended to be long-term, with ICL buying in more Japanese technology, not just for other computer ranges but also for telecommunications and office-of-the-future equipment.

Meanwhile, ICL said it would continue to pursue collaborative ventures elsewhere that would allow it to continue its own research and development program on minicomputers. Last month the company agreed to make and market a minicomputer — the Perq — developed by Three Rivers Corp. of Pittsburgh. ICL sales in the year ended last Sept. 30 totaled \$1.34 billion.

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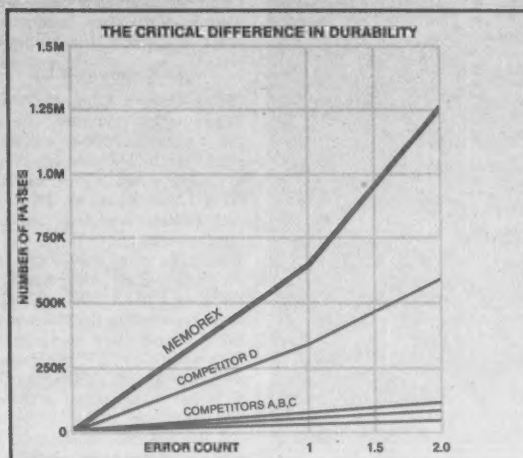
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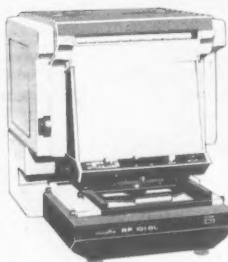
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c-103

Mainframers' Earnings Take Third-Quarter Dip

(Continued from Page 63)

a 43% decline from 1980's earnings, dropping to \$85.9 million or \$2.07 per share from \$150.7 million or \$3.65 per share for the comparable period of 1980.

Burroughs Chairman W. Michael Blumenthal said he expects the firm's operational earnings for the fourth quarter to exceed earnings of last year's final quarter.

He said currency translations would probably reduce overall corporate earnings for 1981 by about \$1 per share. Blumenthal said he was pleased with orders from the company's Federal and Special Systems Divisions, the Office Products Group and from System Development Corp.

NCR Revenues Up 1%

From Dayton, Ohio, NCR reported third-quarter revenues rose a scant 1%, reaching \$800.8 million from \$792.3 million a year ago. This year to date, the firm's revenues have totaled \$2.4 billion, up 7% from the \$2.2 billion reported for the first nine months of 1980.

Earnings for the latest period dropped to \$38.2 million or \$1.41 per share from \$54.5 million or \$2.03 per share reported in the third quarter of 1980. Year-to-date earnings topped \$118 million or \$4.37 per share, a 14% decline from the \$136.7 million or \$5.11 per share earned in the comparable 1980 period.

NCR Chairman William S. Anderson said order rates in the U.S. for

the third period were flat and foreign orders, expressed in U.S. dollars, declined.

"In addition, lower production caused an unusually large proportion of manufacturing costs to be charged against current operations," he said.

CDC's total revenues rose to just over \$1 billion from \$933.5 million in the third quarter of 1980. Revenues from the computer portion of the firm's business were \$767.8 million, up from \$693.7 million in the like quarter a year ago. For the nine-month period, CDC's consolidated revenues were just over \$3 billion, up from \$2.7 billion in the same period a year ago. The computer portion of the firm's revenues was \$2.2 billion for the first nine months of 1981 and \$1.99 billion for the corresponding period of 1980.

Consolidated earnings reached \$44.1 million or \$1.16 per share, with earnings for the computer portion of the business reaching \$31.7 million for the quarter. For the comparable period of 1980, earnings were \$40.2 million or \$1.15 per share, with computers contributing \$24.6 million to total earnings.

For the year to date, total earnings reached \$127.7 million or \$3.35 per share, with computers contributing \$89 million to earnings. For the same period last year, CDC's earnings reached \$114.4 million or \$3.30 per share, with the computer portion of the business earning \$69 million.

Nickels & Dimes

Denelcor, Inc. has privately sold 309,759 shares of its common stock for some \$2,478,000 to a small number of European investors.

\$\$\$

International Applied Systems, Inc. has completed its first round of financing, which was provided by the Graphics Display Partners, Ltd., a partnership that includes Capform I Investment Fund and Courtland Associates.

\$\$\$

AM International, Inc.'s lenders have waived certain requirements of one of the company's revolving credit agreements.

\$\$\$

Plantronics, Inc. intends to purchase up to 300,000 shares of its common stock over the next four to eight weeks in both open market purchases and block purchases to be used in the company's stock option and stock purchase plan.

\$\$\$

Centronics Data Computer Corp. and its lender banks have agreed in principle on terms to restructure the company's credit arrangements. The new two-year pact will provide Centronics with up to \$53 million on a collateralized basis.

\$\$\$

Symbolics, Inc. has announced that General Instrument Corp. has made an equity investment in Symbolics.

\$\$\$

Cipher Data Products, Inc. has made an initial public offering of 1.1

million common shares of stock at \$9.50 per share.

\$\$\$

Corvus Systems, Inc. has made a public offering of one million shares of its common stock at \$10 per share.

\$\$\$

CGA Computer Associates, Inc. has added its common stock to the Federal Reserve Board's current list of 1,407 over-the-counter market securities eligible for purchase under the Federal Reserve's margin or credit regulations.



'No, I'm Not Working All Night. One of These Computers Is the Time Clock and I Can't Find It.'

Supershorts

Burroughs Corp., as part of its continuing program of manufacturing plant consolidation, has moved its Detroit facility to the company's plant site in Plymouth, Mich.

Texas Instruments, Inc. has instituted a new program of appointing selected third-party software development companies as industry applications specialists to provide application programs for specific industries that can be run on TI DS990 computer systems.

Quasar Systems Ltd. of Canada has opened five new sales offices in Los Angeles, Chicago, Atlanta, Boston and Dallas/Fort Worth, Texas.

Fujitsu Laboratories Ltd. has recently developed high-performance integrated circuits using the company's high-electron mobility transistor technology.

Astro Circuits of San Jose, Calif. has changed its name to Apogee Engineering to eliminate any confusion with another printed circuit board manufacturer of the same name in Lowell, Mass.

The Systems Division of Pertec Computer Corp. is relocating its main office to Irvine, Calif. where this division's marketing, engineering and manufacturing facilities are already situated.

Atlantic Software, Inc. has changed its name to Atlantic Management Systems, Inc., effective immediately.

Charles D. Ferris, past chairman of the Federal Communications Commission, has been named general counsel to the International Association of Satellite Users.

Dr. An Wang, founder of Wang Laboratories, Inc., has donated four endowed fellowships amounting to \$1 million to Harvard University. The fellowships have been named in honor of the late Prof. Emory Chafee.

Expansions

Sperry Univac will construct a 40,000 sq-ft addition to its current 20,000 sq-ft manufacturing plant in Ephraim, Utah.

Ramtek Corp. has opened sales and support offices in Cologne and Munich, West Germany, and in Ruislip, England, a London suburb.

Libertore Archives, Inc., a records management firm, opened a 350,000 cubic-ft archival storage facility center in High Point, N.C.

NBI, Inc., a Boulder, Colo.-based manufacturer of word processing equipment, has broken ground for a new \$13 million corporate headquarters, also in Boulder.

Compucorp has leased a 36,500 sq-ft building at 2211 Michigan Ave. in Santa Clara, Calif., for relocation of executive and research and development offices.

one of Dr. Wang's teachers at Harvard.

Candle Corp. has formed an Information Services Division to develop software for office automation and electronic mail.

Beehive International, Inc. recently celebrated the delivery of its 100,000th terminal to Schweber Electronics in Westbury, N.Y.

Signetics Corp. and Honeywell, Inc. have formed a joint technology exchange covering Integrated Schottky Logic gate array technology.

Digital Equipment Corp. will estab-

lish an authorized digital terminals distributor program for U.S. resellers of its video terminal and printer products. Digital also announced that the Graphic Arts Product Group has changed its name to the Publishing & Broadcast Industries Group.

Toshiba America, Inc. plans to open office computer outlets in Costa Mesa and Westwood, Calif.

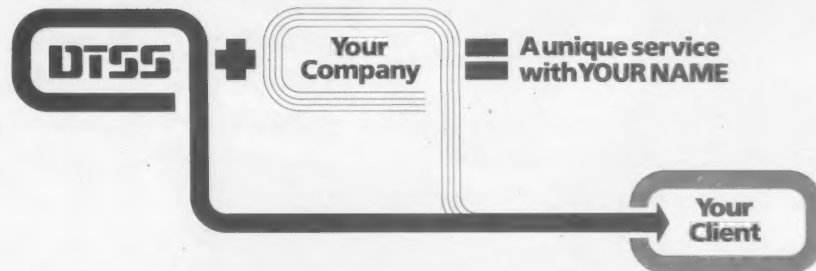
The first Atari, Inc. Regional Software Acquisition Center has opened at 1265 Borregas Ave., Sunnyvale, Calif.

Data General Corp. recently demonstrated its first vertical applications software package in Boston at

the American Production Inventory and Control Society's trade show. Manap is a set of manufacturing software subsystems. DG also announced a marketing program intended to recruit independent software vendors who will develop and market software based on the DG Eclipse system.

Recognition Equipment, Inc. plans to protest a decision by the U.S. Postal Service disqualifying the company from bidding on the Postal Service's procurement of 144 small bar code sorters. The disqualification was based upon the Postal Service's determination that Recognition's equipment failed to meet certain technical specifications.

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Mergers & Acquisitions

Hewlett-Packard Co. has entered into negotiations with **Software Management Corp.** of Santa Clara, Calif., to acquire the software products firm in its entirety through an exchange of stock.

M/A-COM, Inc. has recently acquired **Sigma Data Computing Corp.** along with its subsidiary company, **Sigma Data Services Corp.**, for 550,000 shares of M/A-Com common stock.

Data Dimensions, Inc. will be acquired by a wholly owned subsidiary of **National Computer Communications Corp.** under the terms of a recently completed agreement in principle.

Management Assistance, Inc. (MAI) and **Pertec Computer Corp.** have agreed to the acquisition of certain assets of Pertec by MAI.

TSI International Ltd. has reached an agreement in principle to acquire **Synergetics Corp.** of Bedford, Mass.

National Data Corp. (NDC) and **Rapidata, Inc.** jointly announced an agreement in principle for NDC to acquire the common stock of Rapidata for approximately 1,275,000 shares of NDC common stock.

The Stratford Group, Ltd. has purchased the major portion of the computer leasing operations of **DPF, Inc.**

Contracts & Pacts

Vector Automation, Inc. has entered into a \$3 million research and development agreement with **Vector Research Partnership** to develop advanced computer-aided design and computer-aided manufacturing technology.

Standard Power, Inc. has announced the sale and delivery of its one-millionth power supply to **MDB Systems, Inc.** of Orange, Calif.

Amperif Corp. has received a contract for its cache disk memory system with supporting disk drives, valued at \$1,165,780 over the next five years, from the U.S. Naval Weapons Center at China Lake, Calif.

National Advanced Systems (NAS) and **Hitachi America, Ltd.** have an agreement whereby NAS will market the new IBM-compatible NAS 7360 disk storage subsystems through its worldwide sales organization. Hitachi manufactures the disk storage subsystems.

Logicon, Inc. has received a \$1 million subcontract from **System Development Corp.** to participate in the development of a large data processing system for U.S. Navy intelligence applications.

Codata Systems Corp. has been awarded an \$880,000 contract to provide 16-bit microprocessors to **Century Analysis Corp.** for use in its new line of communications controllers.

Seagate Technology has received a contract from **Convergent Technologies, Inc.** for its ST506 micro-Winchester disk drive.

Intertec Data Systems Corp. has signed a nearly \$4 million manufacturing and OEM licensing agreement with **Irwin International Corp.**

Pansophic Systems, Inc. has acquired the exclusive marketing rights to two software products, **Concept 1** and **Validator**, from **Computer Concepts, Inc.** of Pottomac, Md.

The U.S. Army White Sands Missile Range in New Mexico has placed an order for disk and tape storage subsystems, valued at more than \$1.14 million over three years, with **Amperif Corp.**, a Chatworth, Calif.-based peripheral systems manufacturer.

SAI Technology Co. has received a \$10 million contract from the **Divad Division of Ford Aerospace & Communications Corp.** for a quantity of plasma computer display terminals.

Computervision Corp. has been awarded a \$60 million contract from the U.S. Navy for its computer-aided design and manufacturing systems.

Storage Technology Peripherals Corp. has signed a three-year multi-million dollar contract to supply tape subsystems to **NCR Corp.**

Ramtek Corp. has been awarded a \$1.3 million contract to supply its RM-9400 display generators to **International Applied Systems, Inc.**

Toshiba Corp. has licensed **Structured Systems Group's** entire range of financial and productivity applications packages for distribution with the **Toshiba T200** and **T250** computers.

Tandon Corp. recently won a \$25 million contract from **Tandy Corp.** for new disk drive products to be used in Tandy microcomputers. The contract is the largest single order ever received by Tandon.

Televideo Systems, Inc. has placed a \$2.5 million order with **Data Electronics, Inc.** for 17.3M-byte, high-density digital cartridge tape drives for Winchester backup use.



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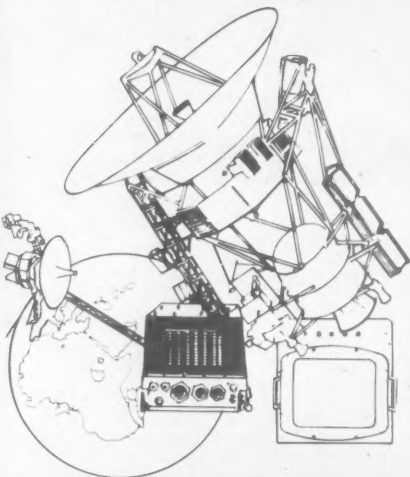
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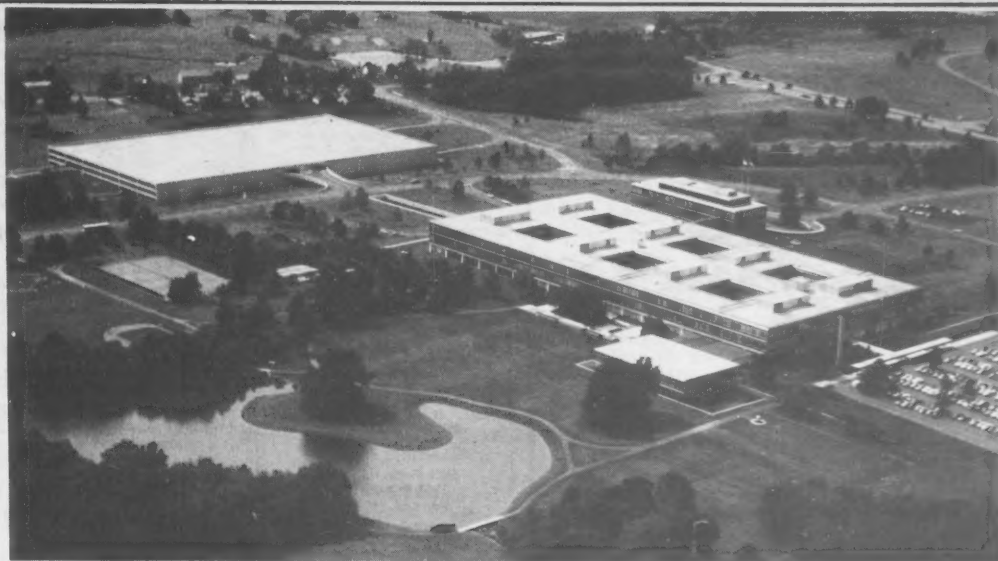
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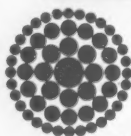
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Will enhance and support the Michigan Terminal System (MTS) operating system and related software on an IBM 3033. Prior experience with the internal of an operating system is required. Prior experience with a data base management system is desirable. College degree desired, but not required.

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Will participate in the support and enhancement of communications software connecting high speed asynchronous terminals and computers to an IBM 3033 and in the extension of the software to serve as a local area network supporting several intelligent hosts and network interface machines. Knowledge of PDP-11 assembler language and previous experience with communications hardware and software is required. Familiarity with Pascal and with IBM 370 assembly language is desirable. College degree desired, but not required.

For immediate consideration, interested and qualified applicants should submit a resume, three professional references, and salary requirements, by November 30, 1981, to: Thomas F. Molloy, Employment Manager, Rensselaer Polytechnic Institute, 110 8th Street, Troy, NY 12181. RPI is an affirmative action/equal opportunity employer.



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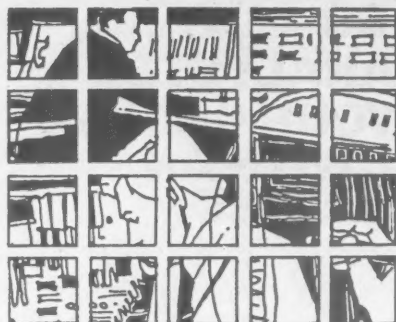
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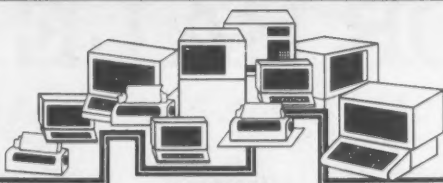
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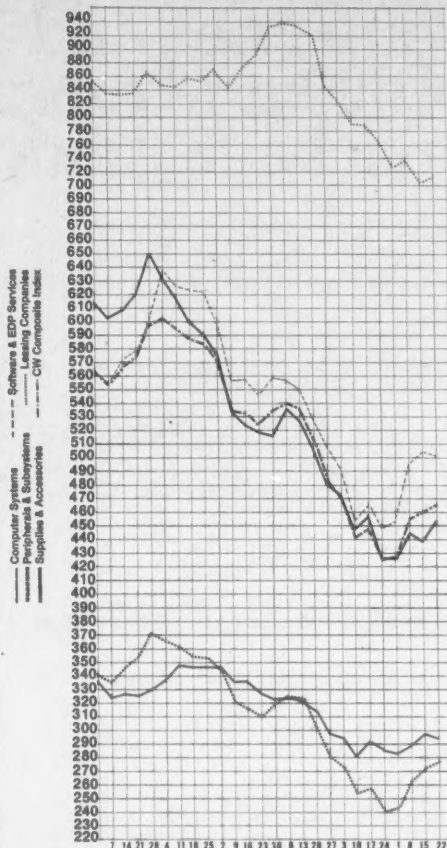
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Computerworld Stock Trading Summary

CLOSING PRICES TUESDAY, OCTOBER 20, 1981

E C H	RANGE	PRICE				E C H	RANGE	PRICE				E C H	RANGE	PRICE									
		1980-81 (1)	CLOSE OCT 20 1981	WEEK NET CHG	WEEK PCT CHG			1980-81 (1)	CLOSE OCT 20 1981	WEEK NET CHG	WEEK PCT CHG			1980-81 (1)	CLOSE OCT 20 1981	WEEK NET CHG	WEEK PCT CHG						
COMPUTER SYSTEMS																							
A	AMDHL CORP	23-48	28 5/8	+1/2	+1.7	D	ADVANCED CORP TECH	3-8	3 1/4	-1	-23.5	A	DATA ACCESS SYSTEMS	5-23	5 3/4	-1/8	-2.1						
N	BURROUGHS CORP	28-72	30 7/8	+3 3/8	+12.2	D	ADVANCED SYSTEMS INC	10-15	11 3/4	+1/4	+2.1	A	DATAPRODUCTS CORP	19-44	24 1/4	+2	+8.9						
O	COMPUTER AUTOMATION	8-28	11 1/4	+1/2	+4.8	O	ANACORP INC	11-19	13 1/2	0	0.0	O	DATUR INC	2-5	2 1/8	+1/8	+6.2						
N	CONTROL DATA CORP	80-84	70 1/2	+3 3/4	+5.8	O	ANALYSTS INTL CORP	3-14	5 1/4	-1/4	-8.3	O	DECISION DATA COMPUT	2-5	2 3/4	+1/4	+8.6						
N	CRAY RESEARCH INC	29-48	37 3/8	+2 1/8	+8.0	A	APPLIED DATA RES.	13-25	18 1/8	+1/2	+8.0	O	DELTA DATA SYSTEMS	2-4	3 1/8	+1/4	+8.6						
N	DATA GENERAL CORP	42-87	51	-1	-1.9	N	AUTOMATIC DATA PROC	22-32	27 1/2	+1/4	+4.7	O	DATARAM CORP	4-15	5 7/8	+1/4	+4.4						
N	DATAPoint CORP	40-88	48 5/8	+2 3/4	+5.9	O	CGA COMPUTER ASSOC	4-25	5 3/4	-1/4	-4.1	N	ELECTRONIC M & R	3-8	3 7/8	+1/8	+3.3						
N	DIGITAL EQUIPMENT	80-113	87 3/8	+4 1/2	+4.0	O	COMPUTER HORIZONS	1-5	2 3/4	-1/4	-8.3	N	EVANS & SUTHERLAND	18-40	30 1/2	+1/2	+1.6						
A	EECO INC	7-18	7 3/4	-1/2	-8.0	O	COMPUTER NETWORK	4-8	4	-1/8	-3.0	O	FABRI-TER	2-6	3 3/4	0	0.0						
N	ELECTRONIC ASSOC.	5-13	5 3/8	-3/8	-8.5	N	COMPUTER SCIENCES	14-30	15 1/2	+1/2	+3.3	N	GENERAL COMPUTER SYS	1-12	6 3/4	-3/4	-10.0						
N	FOUR-PHASE SYSTEMS	18-48	35 1/4	+2 3/4	+8.4	N	COMPUTER TASK GROUP	13-23	15 1/4	0	0.0	N	GEN'L DATA COMM INC	9-19	9 5/8	+1/8	+1.3						
N	FOXBORO	42-82	48 1/2	+7/8	+1.8	O	COMPUTER USAGE	2-10	3 1/8	0	0.0	O	GENERAL TERMINAL CP	1-4	1 3/8	-1/8	-8.3						
O	FULCRUM CORP	1-3	3/8	0	0.0	O	COMSHARE	7-21	8	-1/4	-3.0	N	HAZELTINE CORP	19-25	22 3/4	+1/8	+8.4						
O	GENERAL AUTOMATION	7-18	7 7/8	-1/4	-3.0	O	CULLINANE DATABASE	28-88	82	+8	+10.7	O	INFORMATION INTL INC	8-17	10 3/4	+1/2	+4.8						
N	HARRIS CORP	38-60	42 1/2	+1/8	+0.2	O	DATA DIMENSIONS INC	1-4	3/4	0	0.0	O	INTEL CORP	23-31	24 1/4	-1/2	-2.0						
N	HEWLETT-PACKARD CO	33-54	42 1/2	-7/8	-2.0	O	DATATAB	2-4	4 3/4	0	0.0	O	IPL SYSTEMS INC	8-15	8	0	0.0						
N	HONEYWELL INC	73-115	83 7/8	+4 3/8	+5.5	O	DBI CORP	8-18	4 1/2	+1/8	+1.8	A	LUNDY ELECTRONICS	8-18	8 1/4	-1	-10.8						
N	IBM	51-73	51 5/8	-7/8	-1.8	O	DYATRON CORP	4-11	4 1/8	-1/8	-2.3	N	MSI DATA CORP	11-27	17 1/4	-1/4	-1.4						
O	RAGNUSON CORP SYST	12-32	15 3/4	+1 1/4	+8.6	N	ELECTRONIC DATA SYST	15-30	25	+1 5/8	+6.9	N	MEMOREX	8-18	13 1/4	+1/2	+12.7						
N	MANAGEMENT ASSIST	11-28	11 3/4	+5/8	+5.6	O	INFORMATICS INC	17-34	24	+1/2	+2.1	D	NETWORK SYSTEMS CORP	14-25	18 3/4	+1/2	-2.8						
D	MINI-COMPUTER SYST	1-4	1 1/8	+1/8	+12.5	O	INSYTE CORP	1-3	3 1/8	0	0.0	O	OREX	2-12	8	-2	-20.0						
N	MODULAR COMPUTER SYS	8-32	8	-1/4	-3.0	O	IPS COMPUTER MARKET	1-4	1 3/4	0	0.0	N	PARADYNE CORP	25-32	30 5/8	+1/8	+2.5						
N	MOHAWK DATA SCI	11-32	13 3/8	+7/8	+7.0	O	KEANE ASSOCIATES	4-8	5	0	0.0	N	PENRIL CORP	9-17	9 7/8	-5/8	-5.8						
N	NCR	42-78	44 3/8	+1 1/4	+2.8	A	LOGICOM	23-38	27 1/8	-1/8	-0.4	O	RANTEX CORP	9-23	13 1/8	+2	+17.9						
N	PRIME COMPUTER INC	18-48	25 1/4	+2 1/4	+8.7	O	MNGT SCI AMER INC	17-28	18	-1 3/4	-8.4	N	RECOGNITION EQUIP	7-21	7	+1/8	+1.8						
N	PERKIN-ELMER	21-38	23 3/4	+1	+4.3	O	MATHEMATICA INC	12-18	18	0	0.0	O	SCAN DATA	1-5	1 1/4	0	0.0						
N	SPERRY CORP	30-65	31 5/8	+2	+6.7	O	MATHEMATICAL APP GRP	15-28	20	+3/4	+3.8	N	STORAD TECHNOLOGY	18-27	26 3/4	+1 1/2	+4.2						
O	TANDER COMPUTERS INC	13-35	30 3/4	+1 3/4	+8.0	O	NATIONAL DATA CORP	14-28	19 1/8	0	0.0	O	SYKES DATATRONICS	8-29	25 3/4	+1 1/4	+5.1						
N	TEXAS INSTRUMENTS	81-151	82 3/4	-1/4	-0.3	N	PLANNING RESEARCH	5-13	6	-3/8	-5.8	A	T BAR INC	12-18	14 3/4	+1 3/4	+13.4						
A	WANG LABS.	23-48	28 1/2	+1/2	+1.7	O	PROGRAMMING & SYS	1-2	1 1/4	0	0.0	O	TEC INC	4-7	3 7/8	-1/2	-11.4						
LEADING COMPANIES																							
O	BOOTH FINANCIAL CP	18-28	23 1/2	-1/4	-1.0	O	RAPIDATA INC	5-13	12 1/2	+1/4	+2.0	N	TEKTRONIX INC	46-70	48 5/8	-3/8	-0.7						
N	COMDISCO INC	18-24	21 1/4	+2 1/8	+11.1	O	REYNOLDS & REYNOLD	18-28	18	+1/2	+2.8	N	TELEX	5-9	5 3/8	+1/8	+2.3						
O	COMMERCE GROUP CORP	1-2	7/8	0	0.0	O	SEI CORP	17-28	23	+1/4	+1.0	O	TESDATA SYSTEMS CP	6-17	9 1/8	+3 5/8	+65.9						
O	COMPUTER INSTRUMTS	1-4	1 1/4	0	0.0	O	STSC INC	8-28	7 1/2	-1/4	-3.2	A	TIMEPLEX INC	10-19	11 3/8	+3/8	+3.4						
O	CONTINENTAL INFO SYS	4-9	5 1/2	+1/4	+4.7	O	SCIENTIFIC COMPUTERS	8-18	7 7/8	0	0.0	D	WILTEK INC	1-3	2 1/4	-1/8	-3.2						
A	DCL INC	3-4	3 1/2	-1/8	-3.4	O	SOFTWARE AG	11-23	14 1/4	-1/2	-3.3	SUPPLIES & ACCESSORIES											
N	DPF INC	5-12	10 1/2	+1/2	+5.0	N	TYNSHARE INC	24-38	25	-4 1/2	-15.2	N	AMERICAN BUS PRODS	11-17	11 1/8	-3/8	-3.2						
O	ITEL	1-15	1 1/2	0	0.0	N	URS CORP	11-18	12 1/4	+3/4	+8.5	O	BALTIMORE BUS FORMS	1-2	1	0	0.0						
O	LEASPCORP	1-2	1/8	0	0.0	N	WVLY CORP	7-20	8 3/4	+1/4	+2.6	N	BARRY WRIGHT	15-24	17 1/8	+1/8	+0.7						
A	PIONEER TEX CORP	2-8	3 1/8	-1/8	-3.8	PERIPHERALS & SUBSYSTEMS												O	CYBERNATICS INC	1-2	1	0	0.0
N	RELIANCE GROUP INC	85-98	83 1/4	+1/2	+0.5	N	AM INTERNATIONAL	6-25	8 3/4	-1/2	-8.0	N	DUPLEX PRODUCTS INC	12-17	12 1/8	-1/4	-2.0						
N	U.S. LEASING	18-30	21 3/8	+5/8	+3.0	A	ANDERSON JACOBSON	10-26	12 3/8	+1/8	+1.0	N	ENNIS BUS. FORMS	15-23	18 7/8	+1/8	+0.6						
																		O	3M COMPANY	49-65	51 5/8	+3/4	+1.4
																		N	CHORUS & LTD	20-22	22 1/2	+3/4	+3.4
																		N	NASHUA CORP	17-23	18	-1/2	-2.7
																		O	STANDARD REGISTER	30-41	34 3/4	+1/4	+0.7
																		A	TAB PRODUCTS CO	15-30	16 5/8	-3/4	-6.0
																		N	WALLACE BUS FORMS	22-31	27	-1/4	-0.8
																		O	CITICORP	4-9	5	+3/8	+8.1
																		O	COMPUTER DEVICES INC	4-10	3 1/4	+1/4	+31.2
																		O	CONTRONICS	4-11	4 1/8	-3/8	-9.3
																		O	COMPUTER COMMUN.	1-8	1/4	+1/8	+10.5
																		O	COMPUTER CONSOLES	20-28	21	-3/4	-13.4
																		N	COMPUTER TRANSCEIVER	3-9	4 3/4	-1/2	-8.5
																		N	COMPUTERIZATION CORP	20-48	14 1/2	+1/2	+8.1
																		O	CONRAC CORP	12-28	23	+1 1/8	+8.8
																		O	COMPUTER SYSTEMS	1-2	1/8	0	0.0
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